



# MECHANICAL INEVITABILITY

## Advanced FIT Architecture for Integrated Apparel Systems

*From Invention to Industry-Scale Impact*

*An Engine of Efficiency*

**Sizing ↔ Inventory ↔ Production ↔ Resale ↔ Recycling**

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**Structural FIT Logic –**

*Structural Geometry → Mechanical Law → Apparel Engineering → Programmed to Scale*

*– A Universal Set of Principles Governing Predictable, Scalable Apparel*

*Across All Materials and Production Platforms*

**CORRMETH<sup>TM</sup>**

**WO 2024/094577 A1 · Patented System · NATALIYA DOLENKO GENÈVE SA**

July 2025

# Invention Executive Summary

*Secured · Enforceable · Globally Recognised*

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The **CORRMETH™ system** is the first and only structurally viable method for producing scalable, self-adjusting tailored apparel.

It is protected under **WO 2024/094577 A1**, securing exclusive global rights to its underlying structural logic. International patent authorities have confirmed its independent structural novelty, including over major prior art such as WO 2016/018904 A1 by NIKE Innovate C.V. No legally permissible or technically viable alternative exists to achieve comparable outcomes at scale.

Ready for immediate deployment, the CORRMETH™ system integrates seamlessly with existing programmable knitwear platforms, enabling industrial-scale production of up to **197 million structurally precise garments** annually using current technology.

The invention embeds **Structural FIT Logic** directly into every garment construction through controlled panel alignment, mechanical reinforcement, and defined deformation pathways. It replaces size-based approximation with a mechanically governed, production-ready system.

Quantified market impact includes:

- **Market expansion coefficient: 2.67**
- **Unsold inventory reduction coefficient: 4.67**
- **Inclusivity:** The self-adjusting logic accommodates diverse body types beyond rigid size intervals.

Introducing scalable precision as a structural property, CORRMETH™ transforms the industry from fragmented, size-dependent apparel into a predictable, legally secured infrastructure – a system blueprint with verified economic impact and real-time agility.

By **redefining** conventional textile concepts through **mechanical principles** and **Structural Logic**, CORRMETH™ **secures universal apparel protection – eliminating technical and legal workarounds across all materials, methods, and platforms.**

## Document Purpose

This document formally consolidates the legally protected CORRMETH™ system and its structural, technical and commercial framework as a reference. It establishes an authorised, comprehensive version to inform executive-level decisions regarding the deployment, licensing, and strategic positioning of the system.

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*The information contained herein relates to the legally protected invention titled: “**An Automated Method for Knitting a Tailored Three-Dimensional Garment and a Knit Garment**” – **WO 2024/094577 A1**, including all associated principles, methods, and product configurations as defined strictly within the published patent framework.*

*For explanatory purposes only, this document also describes the **Structural FIT Logic** – the technical and engineering system developed to articulate the functional principles behind the protected method. This explanatory content does not expand, modify, or alter the legal protection granted by the patent or applicable laws. The legal scope and enforceable boundaries are defined exclusively by the formally published patent and all applicable international laws.*

*The terms “**Structural FIT Logic**” and “**Advanced FIT Architecture**” refer specifically to the proprietary system developed by **NATALIYA DOLENKO GENÈVE SA** and protected under **WO 2024/094577 A1**. Use of these terms to describe apparel, production methods, or technologies without licensed access to the patented system constitutes misleading representation.*

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# MECHANICAL INEVITABILITY

*It works because:*

*Structural Geometry → Mechanical Law → Apparel Engineering → Programmed to Scale*

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## **Structural Logic – A Foundation Long Understood in Other Fields**

*In technical fields such as architecture, engineering and software development, structural logic forms the basis for function, performance and design. The outcome depends not only on the tools and materials used, but also on how they are applied within a system governed by structural principles.*

*Although advanced technology has been available in the apparel industry for decades, it has primarily been used to improve product aesthetics, with garment construction continuing to follow conventional sizing and patterning methods.*

*The fundamental question is this: can the body and its movements be understood as a predictable system, and can garments become integrated, self-regulating interfaces?*

*This method treats the body as a predictable system and the garment as an integrated, self-regulating interface. This is not achieved through artificial mechanisms, but through Structural FIT Logic, which is engineered and embedded directly into the garment.*

***FIT becomes a technical property: engineered, repeatable, and legally protected.***

Overview

Invention Position Snapshot

Secured · Enforceable · Globally Recognised

The CORRMETH<sup>TM</sup> method is already protected across the world’s key innovation and apparel markets. International patent authorities have confirmed its structural novelty and legal defensibility. The system is positioned as the only viable route to scalable, self-adjusting tailored apparel.

| Aspect                 | Details                                                                                                                                                                                                                                                                                                     |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Patent Reference       | WO 2024/094577 A1 · CPC D04B 1 · Priority: 2 November 2022 · NATALIYA DOLENKO GENEVE SA · Inventor: DOLENKO, Nataliya                                                                                                                                                                                       |
| Global Coverage        | Europe · United States · China · Other priority markets in progress                                                                                                                                                                                                                                         |
| Market Reach           | 2.19 billion people · ~ 80 – 89% of global apparel market spending                                                                                                                                                                                                                                          |
| Structural Novelty     | Confirmed independent from all known prior art, including WO 2016/018904 A1 · CPC D04B 1 · NIKE Innovate C.V. · Inventor: MEIR, Adrian                                                                                                                                                                      |
| Protected Domain       | Advanced FIT Architecture for Integrated Apparel Systems – scalable, self-adjusting tailored apparel                                                                                                                                                                                                        |
| Barrier to Entry       | Competing systems require €40 – 60 billion R&D · 15 – 20 years · No legal guarantee                                                                                                                                                                                                                         |
| Scalability            | Unlimited. Fully compatible with existing programmable high-tech knitwear infrastructure (2- and 4-bed machinery) enabling industrial-scale production. With available technology, up to 197 million structurally precise garments can already be produced annually                                         |
| Extended Market Impact | Market expansion coefficient: 2.67 – each programmed construction covers up to four standard sizes<br>Inclusivity: Self-adjustment accommodates diverse body types beyond rigid size intervals<br>Unsold inventory reduction coefficient: 4.67× improvement compared to conventional tailored woven apparel |

## CORRMETH™: The Logic for Scalable FIT Infrastructure

**CORRMETH™** – a WIPO-published invention (WO 2024/094577 A1) – is one of the world's leading innovations. It has pending applications across jurisdictions, covering most of the global apparel and innovation markets.

This invention solves a long-standing structural flaw at the heart of the apparel industry: its inability to deliver a tailored FIT on a large scale. It does this by employing **Structural FIT Logic**.

Built on a Chain of Execution:

***Structural Geometry → Mechanical Law → Apparel Engineering → Programmed to Scale***

- The method provides the first scalable apparel system where structural shaping, self-adjustment, and tailored FIT are fully pre-programmed – transforming garments from static products into dynamic, mechanically governed systems ready for precise, repeatable production at any scale.

### From Reactive FIT to Engineered Certainty

This patented system replaces FIT as a reactive, size-dependent approximation with a pre-programmed, mechanically governed structure. By embedding Structural FIT Logic directly into garment architecture – through controlled panel interdependence, angular deformation, and reinforcement logic – it **delivers precise, self-adjusting FIT at scale**.

Unlike conventional methods reliant on elasticity, tailoring, or manual adjustment, CORRMETH™ governs garment behaviour through **predefined mechanical logic**. The system aligns panel response, angular deformation, and reinforcement interaction – enabling garments to adapt to the human body while maintaining structure, stability, and long-term recovery.

The technology-agnostic, production-ready system enables perfectly fitting garments for up to 197 million wearers annually using existing global infrastructure. By expanding FIT coverage from one to four conventional sizes per SKU, **market reach increases by a factor of 2.67** – without increasing SKU count. Instead of forcing **243 structurally distinct FIT Cases** into each rigid size, disregarding true human diversity, the method's Structural Logic adapts in real time through mechanically governed panel logic – **replacing FIT uncertainty with scalable precision**.

#### In Essence:

The patented invention provides the only legally viable structural system for embedding responsive, adaptive FIT directly into programmable apparel – enabling scalable precision, predictable outcomes, and real-time adaptability at any production volume.

By structurally resolving the industry's most persistent limitations – FIT inconsistency, size fragmentation, material waste, and instability – CORRMETH™ establishes the foundation for scalable, legally protected apparel infrastructure.

This document introduces the Structural Logic; its immediate application and system-wide impact are detailed in the document, *From Structural Logic to Immediate Application*.

**FIT is no longer estimated. It is structurally defined – and programmed to scale.**

## CORRMETH<sup>TM</sup> Suite – Legal & Patent Framework

*From Industry Approximation to Structurally Governed Certainty*

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**CORRMETH<sup>TM</sup> is a patented Advanced FIT Architecture system that replaces fixed sizing with structural intelligence, embedding Structural FIT Logic directly into the garment to deliver real-time, tailored FIT at scale.**

Everything can be deconstructed, modelled and rebuilt, provided you understand its structure.

**CORRMETH<sup>TM</sup> does exactly that:**

- **It systematises tailored FIT into a mechanically governable, executable infrastructure – where FIT is no longer approximated, but structurally engineered from the inside out.**

### System Logic

Regardless of the application domain – economic, mechanical, or biological – **all systems share:**

- Inputs
- Outputs
- Feedback loops
- Regulatory mechanisms
- Tolerances and deviations to be managed.

The patented method is legally classified under **CPC D04B 1 (Knitwear)** and, due to its mechanical nature, also falls within the remit of broader technical domains. This ensures its immediate applicability to programmable knitwear and establishes its legal defensibility as **Structural FIT Logic** within evolving hybrid systems.

### How the Method Works

Unlike traditional apparel systems, which rely on measurements, sensors, or manual adjustments, this **method integrates:**

- **Angular panel alignment**
- **Internal reinforcement logic**
- **Controlled deformation paths**

Once finalised, the entire structure is fully programmed into **Preset Constructions** and executed with precision on a large scale using high-tech knitwear. This eliminates the need for external fasteners, elastic zones, or tailoring labour.

The outcome is a scalable system that adapts to almost all body types by embedding the precision of tailoring directly into the production process.

This marks the first instance of self-adjusting, structurally stable Preset Constructions for all types of garment, made possible entirely through **mechanically based inter-panel logic**. This results in **mechanically governed panel interdependence** and an optimised garment structure.

## What the Method Introduces and Secures

This method does not refine tailoring – it **eliminates its structural limitations** altogether.

### It introduces:

→ **Scalable FIT system** that applies to nearly all body types while requiring only a fraction of the SKU required by conventional methods.

→ **Only manufacturing method** that structurally embeds tailoring precision directly into mass production through self-adjusting garments.

→ **Legally protected construction system** that cannot be bypassed without:

- Replacing the domain-specific rules of apparel construction – such as cut-and-sew for woven fabrics, or layer-by-layer fabrication for 3D printing.
- Independently inventing a new physical system capable of achieving garment-level mechanical adaptation, which does not yet exist.

## What the System Unlocks

→ **Perfect FIT at mass scale** – adapting seamlessly to morphological diversity.

→ **SKU reduction by definition – through structural mechanics:**

- Replacing the conventional eight-size model with a three-size system of self-adjusting garments eliminates the need for size-based SKU multiplication.

→ **Predictable outcomes** – no tailoring adjustments, no measurements and no customer-specific customisation are required.

→ **Legal immunity** – no structural workaround can achieve the same outcome without infringing the patented logic.

**The patented method provides a legally secured, structurally engineered foundation for a new apparel system, rendering conventional FIT adaptations obsolete.**

**This represents a fundamental shift from reactive correction to pre-engineered certainty.**

**It is not a refinement – it is the only system capable of delivering perfect FIT at scale through Structural FIT Logic alone.**

# Structural Progression – From FIT to Fully Programmable Systems

*Secured · Enforceable · Globally Recognised*

CORRMETH<sup>TM</sup> restructures apparel into a predictive, scalable system – delivering real-time production, system intelligence, circularity, and self-adjusting perfect FIT at industrial scale.

| Level | System Advancement                       | Key Outcome                                                                                                      |
|-------|------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| D     | Predictive Control & System Intelligence | Data-driven scalability and real-time production precision global operations become programmable and responsive. |
| C     | Restructured Operational Model           | Outcome predictability and process integration – FIT, quality, and logistics unified under one structural logic. |
| B     | Systemic Circularity                     | Material efficiency, fibre recovery and waste elimination: circularity is engineered into every stage.           |
| A     | Perfect FIT at Scale                     | Structural FIT replaces rigid sizing, reducing mismatches, inventory distortion and returns across all markets.  |

This document defines the only legally protected structural pathway for scalable, self-adjusting tailored apparel – replacing size-based approximation with engineered, production-ready certainty.

**Chapters 1–22** define the structural, legal, and commercial framework.

**Chapters 23–28** present the technical progression and engineering logic behind the system.

# Secured Global Rights & Structural Foundations of Programmable, Engineered FIT – Overview

## Invention, Coverage, Recognition – Global Protection Framework

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### Chapter 1 – Legal Foundation of Protection

The invention *An Automated Method for Knitting a Tailored Three-Dimensional Garment, and a Knit Garment* is formally protected under **WO 2024/094577 A1**, published 10 May 2024. Patent filings (2025) secure international coverage through the European Patent Convention, the United States, and China, with priority established from 2 November 2022 (EP4365344A1). The legal ownership is held by NATALIYA DOLENKO GENÈVE SA. These filings together establish exclusive global protection over the introduced method and system, ensuring that all structural configurations, applications and commercial deployments of the invention fall within a defined, enforceable legal domain.

### Chapter 2 – Jurisdictional Coverage Across Key Innovation and Apparel Markets

The invention is protected in Europe, the United States and China, covering around 2.19 billion people and accounting for 80–89% of global apparel market spending. This strategic reach ensures technical and commercial exclusivity within the world's leading luxury, apparel and technology ecosystems. This coverage not only secures the invention itself, but also the full commercial and technological opportunity it enables. The patent framework is aligned with next-generation, AI-integrated design systems and adaptive garment technologies, ensuring legal and commercial defensibility in all relevant growth markets.

### Chapter 3 – Global Validation & Market Positioning in Structural Apparel Innovation

This chapter establishes the global recognition and structural significance of the patented invention. It details how **WO 2024/094577 A1 introduces the first scalable apparel system** to deliver **perfect FIT** through mechanically governed panel interaction – a structural breakthrough during the international PCT examination. The invention's claims were tested against key prior art, including the high-impact NIKE Innovate C.V. invention (WO 2016/018904 A1), and were confirmed to be structurally original and legally defensible. It is positioned within the highest tier of structural knitwear patents as a recognised, independently protected structural framework, defining a novel discipline: **Advanced FIT Architecture for Integrated Apparel Systems**.

## Chapter 4 – Patent Scope and Structural Coverage in Plain Terms

WO 2024/094577 A1 secures the only legally protected method for scalable, self-adjusting apparel through mechanically based inter-panel logic – thereby establishing a new structural discipline: **Advanced FIT Architecture for Integrated Apparel Systems**. This protection goes beyond the functional outcomes of knitwear, covering the underlying mechanical movement construction logic, including bias-knit configurations, angular orientations and structural reinforcement. This enables responsive, scalable FIT to be embedded into the design of garments.

## Foundations & Structural Logic of Advanced FIT Architecture

### Chapter 5 – Advanced FIT Architecture for Integrated Apparel Systems

The invention introduces a new structural category for the apparel industry: **Advanced FIT Architecture**. This system replaces reactive tailoring with **engineered, mechanically governed constructions**, that **incorporate Structural FIT Logic directly into any garment**. Through adaptive panel logic and targeted reinforcement, garments can self-adjust and achieve tailored precision without the need for elastic fibres, sensors or customisation. The result is a licensable system that transforms FIT from a subjective approximation into a repeatable and scalable structural property, providing a stable and verified framework for the engineering of responsive and high-precision garments.

### Chapter 6 – Structural FIT Logic as Aesthetic Calibration

The invention determines both form and FIT through Structural Logic, eliminating the need for manual adjustments or subjective evaluation. Angular panel alignment, targeted reinforcement and controlled deformation determine how the garment will behave, ensuring visual precision and dynamic performance. The system is governed by a chain of execution, from structural geometry to mechanical law and programmable construction, and it embeds adaptability into the garment's architecture. This delivers a tailored, self-adjusting FIT at scale that is structurally programmed from the outset.

### Chapter 7 – Foundational Domains

#### *Foundational Domains*

This chapter outlines the technical disciplines that underpin the patented method. Drawing on tailoring logic, structural geometry, mechanical engineering, apparel science and programmable knitwear technology, the invention brings together these fields to create a coherent, logic-driven method. These domains underpin the system's ability to structurally embed adaptable fit, replacing traditional size systems with engineered, scalable precision.

## Chapter 8 – Methodological Framework

*Foundational Domains → Applied Framework*

This chapter explains how the invention transforms its technical principles into a functioning, scalable system. The convergence of structural geometry, mechanical law and tailoring principles gives rise to a scalable, logic-driven system that governs garment behaviour. This method provides adaptive FIT and shape control as a structural feature, eliminating the need for tailoring or customisation. This engineered precision is achieved through programmable knitwear platforms, which enable the mass-market production of self-adjusting, high-performance apparel.

## Chapter 9 – Interdisciplinary Integration and Technological Translation

*Foundational Domains → Applied Framework → Cross-Disciplinary Synthesis*

This invention combines tailoring, engineering and computer science to create a unified structural system. It translates the logic of spatial patterns, deformation mechanics and material behaviour into a programmable framework for adaptive apparel. The result is **Advanced FIT Architecture**: a structurally independent system in which adaptive FIT is engineered, automated and delivered with precision, consistency and speed across apparel categories and production scales.

## The Secured Structural Logic – Locked Pathway, Technical Exclusivity, and Industry Application for Scalable, Self-Adjusting Tailored Apparel

## Chapter 10 – Angular Inevitability: The Locked Foundation of Self-Adjusting Tailored Apparel

*Foundations*

The **patented method secures the only viable structural pathway** to fully automated, scalable, self-adjusting tailored apparel. It protects any knit construction combining geometric or freeform panels with angled edges, alongside targeted reinforcement, to mechanically trigger real-time self-adjustment. These structural elements control flexibility, deformation and tailored shaping, while ensuring stability across all garment types. The system applies to constructions made with virtually any type of mono-yarn, which demonstrates its broad technical applicability. The patent also specifies the minimum structural conditions required to achieve these outcomes, ensuring that any variation to panel configuration, reinforcement or material composition remains within the protected system. **Angular logic and reinforcement together define a fully enclosed mechanical domain** – leaving **no alternative structural route for delivering scalable, self-adjusting, tailored apparel in programmable knitwear**.

## Chapter 11 – Structural Integration: Not Additive Enhancement

*Foundations → Structural Integration*

The system achieves structural integration of self-adjusting FIT directly within garment construction – moving beyond the industry's additive design and reactive tailoring approaches. Through engineered panel orientation, reinforcement and mechanically governed inter-panel logic, adaptability and shaping are inherent properties of the garment itself. This is not an optional feature or zone; it is fully embedded and legally protected structural logic that secures the essential minimum conditions required to deliver tailored, responsive FIT at scale, as well as full-scale implementation.

## Chapter 12 – Novelty Over Prior Art

*Foundations → Structural Integration → Legal and Technical Novelty*

This invention introduces structural and functional capabilities that were unachievable with previous technologies. Traditional approaches relied on zonal functionality, surface aesthetics or external mechanisms to approximate FIT. By contrast, this system incorporates dynamic shaping, stability and real-time self-adjustment directly into the garment through structural engineering alone. Replacing reactive patterning with logic-based shaping delivers fully integrated, scalable FIT through programmable knitwear without the need for external supports or complex materials.

## Chapter 13 – Cross-Domain Application of the Patented Principles

*Foundations → Structural Integration → Legal and Technical Novelty → Broad Application*

While structurally independent and legally distinct, the system is applicable across industries that require adaptive structures. It provides a self-adjusting, mechanically governed foundation for conventional wearables, advanced sensor-integrated garments, large-scale apparel production and creative, high-fashion engineering. By embedding **Structural FIT Logic** at its core, the method enables scalable comfort, stability and real-time responsive FIT, establishing a cross-disciplinary engineering standard for responsive FIT across design and production.

## Chapter 14 – Key Market Applications

The patented system provides scalable, self-adjusting FIT and structural precision in core apparel sectors and beyond. It enables real-time structural tailoring and adaptive behaviour in fashion items, medical wearables, sportswear, industrial clothing and smart textiles. Embedding Structural FIT Logic in garment construction establishes a universal foundation for dynamic, structurally governed apparel, meeting the demands of existing and emerging markets on a large scale.

## Impact Beyond FIT – Structural Advantage, Market Exclusivity, Real-World Scalability

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### Chapter 15 – From Invention to Industry-Scale Impact

This chapter defines how the patented system restructures garment production into a scalable, legally protected infrastructure for delivering self-adjusting, tailored apparel with structural certainty at mass scale. Through embedded Structural FIT Logic, the system replaces fragmented processes with engineered precision – enabling proven outcomes, including SKU reduction by 75%, unsold garment reduction by 78.6%, production time cut by 84%, and CO<sub>2</sub> emissions reduced by up to 72% with recycled fibres. These results establish the system as the first operational framework for scalable, adaptive FIT with verified efficiency, sustainability, and legal exclusivity.

### Chapter 16 – Competitive Moat and Legal Lock-In

This chapter defines how the invention establishes structural exclusivity beyond machine, material, or software limitations. Unlike AI- or sensor-dependent technologies, the system is governed by mechanical logic embedded directly into garment construction. It captures all viable pathways to scalable, self-adjusting apparel through mechanically based inter-panel logic and targeted reinforcement. The method delivers programmable outcomes *without* being defined by programming itself – securing legal clarity for partners and preventing any technical or legal replication of its functional behaviour.

### Chapter 17 – Practical Extensions: Structural Support Beyond Aesthetics

This chapter defines how the patented method extends beyond FIT correction to discreetly deliver structurally intelligent, supportive garments without medical classification. Through embedded deformation paths and mechanically reinforcement zones, the system enables posture alignment, targeted shaping for asymmetries, and subtle structural support – all produced through programmable knitwear without reliance on stretch, padding, or electronics. These features open new consumer categories for supportive-wear, posture-assist fashion, and inclusive tailoring – providing discreet stability, comfort, and structural precision within a fully non-medical, legally protected framework.

### Chapter 18 – Market-Specific Adaptation Through Structural Complexity

This chapter defines how the patented system enables modular structural adaptation across market tiers without compromising legal protection or performance. The system provides a flexible framework where construction complexity and shaping precision are adjusted to meet mass-market, luxury, or performance requirements – all governed by the same protected Structural FIT Logic. This ensures scalable FIT, production efficiency, and tailored precision across product categories – delivering legally secured, structurally consistent outcomes from entry-level to high-end markets.

# Legal Protection – Structural Logic, Technical Scope & Enforceability

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## Chapter 19 – Legal Scope and Enforceability

*Logic Level → Method Level → Garment Level → System Level*

This chapter outlines how the patented system secures legal exclusivity, regardless of the machine type, material selection or textile domain for which it has been registered under **CPC D04B**. Although it is classified under programmable knitwear technologies, **protection is provided for the mechanically governed principle of adaptive tailoring through structural interdependence, regardless of the platform, fibre or production method used**. The patent covers all possible methods of achieving real-time, self-adjusting tailored garments through the use of embedded structural **Fit Logic**, controlled deformation and mechanically based inter-panel logic. This protection applies at all structural levels, from logic and method to garment and system, ensuring that any attempt to replicate the outcome, whether through an equivalent structure, materials or processes, remains within the protected domain and is subject to legal enforcement.

## Chapter 20 – Scope of Legal Protection

This chapter defines the technical and legal boundaries securing the invention across machines, materials, and domains. Classified under CPC D04B programmable knitwear (2- and 4-bed systems), the patent protects the only known mechanically viable principle for scalable, self-adjusting, tailored garments – delivered through pre-programmed, mechanically governed inter-panel logic and structural interdependence. This protection extends beyond knitwear to woven systems, hybrid platforms, and future technologies that structurally replicate the same structural outcome. Enforceability applies under established **Equivalence Doctrines across Europe, the United States, China**, and other key markets – locking all viable pathways to achieving dynamic FIT, regardless of method or material. Any garment or system delivering the same structural function – through mechanical deformation, directional control, and targeted reinforcement – falls within the protected scope, ensuring comprehensive, cross-domain legal exclusivity for the patented method.

## Chapter 21 – What the Patent Protects in Full

This chapter defines the structural and legal protection secured by the patented system. It protects the only known method for scalable, real-time, self-adjusting, tailored garments – achieved through pre-programmed, mechanically governed inter-panel logic and structural interdependence. The protection applies to any garment, process, or system delivering self-adjusting FIT through engineered angular displacement, targeted reinforcement, and dynamic interaction – regardless of machine, material, or production method. Manual tailoring, elasticity-dependent solutions, or sensor-based systems remain structurally excluded. **The protection locks all viable pathways to replicating the structural logic and mechanically governed outcomes secured by the invention.**

## Chapter 22 – Comprehensive Summary: Structural FIT Logic & Advanced FIT Architecture

This chapter consolidates the structural, legal, and operational advantages of the patented method as detailed throughout Part I. It defines how the invention secures the only legally protected, scalable system for delivering real-time, self-adjusting, tailored apparel through embedded Structural FIT Logic. By integrating mechanically governed angular panel alignment, targeted reinforcement, and dynamic inter-panel behaviour directly into garment construction, the system eliminates reliance on fragmented sizing, manual tailoring, and reactive design processes. Recognised as structurally novel by international patent authorities and protected across key global markets, the invention replaces traditional tailoring with a unified, programmable framework – providing a proven, scalable infrastructure for adaptive FIT. Its technical, commercial, and environmental impact – demonstrated throughout this document – defines a new engineering and legal standard for mass-produced, precision-FIT apparel, establishing **Advanced FIT Architecture as the structural benchmark for the future of scalable, self-adjusting garment systems.**

### TECH DEEP DIVE

*Structural Principles, Engineering Logic, and Scalable Application*

*This Part of the Document Assumes a Moderately High Level of Technical or Apparel Engineering Literacy*

## Engineering Foundations – Structural Logic and the Knitwear Breakthrough

### Chapter 23 – Structural Logic for Scalable Apparel Engineering

This chapter includes *Patent Abstract – WO2024/094577 A1* and defines how the patented system introduces a structural foundation previously absent from programmable knitwear. While CAM/CAD technologies have existed since the 1980s, they lacked the structural garment engineering logic to deliver scalable, self-adjusting tailored apparel. The invention embeds Structural FIT Logic directly into garment construction, merging mechanical principles, digital programmability, and knitwear capabilities into one system. It transforms programmable knitwear from an aesthetic or surface-level tool into a framework for engineered, scalable tailoring, enabling dynamic self-adjustment across garment types. **The method functions as a programmable, self-adaptive structural ‘mannequin’ – producing garments that dynamically adjust to anatomical diversity with engineered structural precision.**

## Chapter 24 – Why Knitwear Enabled the Breakthrough

This chapter defines why programmable knitwear – not woven tailoring – made scalable, self-adjusting apparel possible. Woven garments rely on fixed seams and patterns, limiting adaptability and excluding structural innovation beyond fabric choice or finishing. By contrast, programmable knitwear controls stitch formation, tension, and shaping within a single process, eliminating the need for seams and allowing structural behaviour to be engineered from the fibre level. While prior art focused on localised functionality like compression zones, **no system redefined overall structural behaviour** or replaced traditional tailoring logic. The **patented method achieves this** – delivering scalable, self-adjusting, tailored apparel by embedding structural logic directly into garment construction, without reliance on external mechanisms or personalisation infrastructure.

## Structural Reengineering – Establishing Advanced FIT Architecture

### Chapter 25 – Establishing an Advanced FIT Architecture

This chapter defines how the invention introduces a new structural discipline: Advanced FIT Architecture. It unifies tailored precision and real-time adaptability within one programmable structure – resolving the historical contradiction between FIT and flexibility. The method replaces static sizing with a structurally programmable, self-adjusting logic, embedded directly into the garment. It delivers responsive, tailored shaping at scale without fasteners, elastics, or body scans – enabling the industry to achieve FIT as a dynamic structural function, rather than a fixed or elastic approximation.

### Chapter 26 – From Pattern-Based Assumptions to Engineered FIT

This chapter explains how legacy sizing systems embed structural misalignment through paper-based pattern logic and statistical averaging. Each conventional size label covers over **243 distinct structural profile types**, causing systemic mis-FIT and operational inefficiency. The **patented method replaces these approximations with engineered Structural FIT Logic**, embedding mechanical precision and interdependent shaping directly into garment construction. The result is **apparel that is scalable and anatomically responsive**, eliminating the need for pattern grading and statistical sizing.

### Chapter 27 – Structural FIT Logic as an Engine of Efficiency

This chapter defines how **Structural FIT Logic transforms apparel** from a fragmented, reactive system into a **scalable, programmable infrastructure for engineered FIT**. The method introduces mechanical interdependence – using angular panel behaviour and targeted reinforcement to deliver self-adjustment and tailored shaping. The system eliminates post-production tailoring, grading assumptions, and size proliferation. FIT becomes a pre-programmed structural property, engineered from the outset and consistently executable across programmable knitwear platforms, enabling tailored apparel at scale with no viable technical alternative.

# Language of FIT – The Engineering System for Self-Adjusting Apparel

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## Chapter 28 – Structural FIT Logic

This chapter outlines the details of how the patented method provides the only mechanically viable and legally protected framework for scalable, self-adjusting, structurally tailored apparel. The system incorporates controlled angular panel configurations and integrated reinforcement into future programmable knitwear constructions. **All angular deviations – other than 0°, 90°, 180°, 270°, and 360° – being structurally defined, pre-programmed, and legally protected as part of the method.** These angles govern deformation, directional shaping, and structural behaviour. The combination of **reinforcement lines** and **freeform panels** stabilises panel interaction and prevents distortion. This construction enables real-time self-adjustment, eliminating the need for external mechanisms. These structural principles are applied across isolated edges, multi-angle panels and integrated angular line behaviour, ensuring consistent, scalable and legally secure FIT across different types of garment, sizes and body shapes. This chapter assumes an intermediate to advanced level of technical or apparel engineering literacy.

### Subchapters:

1. – Streamlined Structural System
2. – Universal Mechanical Principles: Angular Behaviour
3. – Redefining Bias Principles in Knitwear
4. – Structural Application of the Angular Principle
5. – Multi-Level Angular Integration
6. – Reinforcement Lines for Structural Stability
7. – Reinforcement for Load, Memory, and Balance
8. – Illustrative Technical Example: Angular Control and Reinforcement
9. – Executive Summary: Structural FIT Logic Protection
10. – Legally Protected Structural Framework for Advanced FIT Architecture

# Structural Boundaries & Legal Dominance Across Adjacent and Emerging Industries

## Chapter 29 – Legal, Technical, and Practical Boundary Review

This chapter defines the boundaries securing the patented method as the only viable, scalable system for real-time, self-adjusting, structurally tailored apparel. Adjacent fields cannot replicate its outcome or escape infringement. Woven tailoring remains static, labour-intensive, and fragmented by rigid sizing. Scalable self-adjustment is structurally impossible. 3D printing lacks textile behaviour, real-time adaptability, and production speed. No hybrid knit–3D print platform achieves self-adjusting apparel. Any system where knitwear drives shaping remains legally contained within the patent. Although smart textiles and sensor-based garments add functionality, they cannot replace mechanically governed, structure-based FIT behaviour. **Structural adaptability remains dependent on the protected logic.** Emerging research in areas such as soft robotics, 4D materials and programmable composites lacks material compatibility, proven scalability and structural viability. **Mechanical, geometric and material constraints apply universally.** No lab-scale theory bypasses the need for interdependent panel logic and engineered deformation. **EPC, US and Chinese equivalence doctrines ensure that all mechanically governed, self-adjusting systems remain within the scope of the patent.** There is no proven or emerging method that offers a technical, structural or legal pathway around the protected system.

## Chapter 30 – Legal Executive Summary

This chapter defines how the patented method secures the only legally and technically viable system for scalable, self-adjusting, tailored apparel. By embedding engineered panel logic, mechanical control, and structural reinforcement, the method transforms FIT from a reactive outcome into a programmable, structurally governed result – consistent and repeatable at scale. Protection applies across all levels: logic, method, garment, and system. There is no viable technical or legal alternative under current or foreseeable industry, material or manufacturing frameworks.

## Chapter 31 – The Only Theoretical Bypass: Full Paradigm Shift

This chapter defines why the patented method structurally and legally locks all viable pathways to scalable, self-adjusting, tailored apparel. Adjacent technologies – cannot match its structural logic or evade infringement. Legal protections under EPC, U.S., and Chinese law, reinforced by public disclosure, secure all mechanically governed routes. The only theoretical bypass demands a full paradigm shift: a new manufacturing category, undiscovered materials, unknown structural principles – requiring decades and billions in R&D with no guaranteed outcome. Iterative workarounds are impossible. The system's Chain of Execution: **Structural Geometry → Mechanical Law → Apparel Engineering → Programmed to Scale** – leaves no alternative within known technical, legal, or industrial boundaries.

## Chapter 32 – DEFINITIVE SYSTEM SUMMARY:

### Legal, Technical, and Market Position

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## FOUNDATION: Patented Invention, Coverage, Recognition – Global Protection Framework

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The patented invention *An automated method for knitting a tailored three-dimensional garment, and a knit garment* is protected under WO 2024/094577 A1 (CPC D04B1), published on 10 May 2024, with ownership secured by Nataliya Dolenko Genève SA. Patent filings provide protection across Europe, the United States, and China (formal application details available upon request and subject to NDA), covering approximately 2.19 billion people and up to 89% of global apparel market value.

The invention introduces a legally protected structural system, defined as Advanced FIT Architecture for Integrated Apparel Systems. This system enables the production of scalable, self-adjusting, tailored garments through mechanically governed panel interaction, independently of sensors, elastic fibres or customisation.

The system has been formally recognised as structurally novel by international patent authorities. Its claims were tested against high-profile prior art, including WO 2016/018904 A1 (CPC D04B1, Nike Innovate C.V.), and independently validated. Within this field, only one other structurally novel invention has been recognised to date: WO 2023/069764 A3 (CPC D04B1, Nike Innovate C.V., footwear).

This invention secures the legal protection of mechanically based inter-panel logic, angular configurations and targeted reinforcement, establishing the only enforceable and scalable pathway to programmable, self-adjusting apparel. It establishes structural, legal and commercial dominance in next-generation apparel engineering.

# 1. Legal Foundation of Protection

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## Patented Invention Title:

**AN AUTOMATED METHOD FOR KNITTING A TAILORED  
THREE-DIMENSIONAL GARMENT, AND A KNIT GARMENT**

**WIPO Publication Number: WO 2024/094577 A1**

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## Applications by Jurisdiction

- **WIPO (International):**
  - **WO 2024/094577 A1 – Published 10 May 2024**
  - PCT/EP2023/080128 – Filed 27 October 2023
- **EPC – European Patent Convention:**
  - Regional phase entry based on: PCT/EP2023/080128
  - Filed 2025
  - Formal application number: Available upon request and subject to NDA
  - Jurisdiction: Up to 39 EPO contracting states
- **United States (USPTO):**
  - National phase entry based on: PCT/EP2023/080128
  - Filed 2025
  - Formal application number: Available upon request and subject to NDA
  - Jurisdiction: Full protection within the United States
- **China (CNIPA):**
  - National phase entry based on: PCT/EP2023/080128
  - Filed 2025
  - Formal application number: Available upon request and subject to NDA
  - Jurisdiction: Full protection across mainland China

## Priority

- **Priority Date: 2 November 2022**
- **From original EP filing: EP22205011.4A**
- **Published as: EP4365344A1 – 8 May 2024**

## Legal Entities

- **Applicant: NATALIYA DOLENKO GENEVE SA [CH]/[CH]**
- **Inventor: DOLENKO, Nataliya**

## 2. Jurisdictional Coverage Across Key Innovation and Apparel Markets

*Securing Rights Across High-Value Apparel Ecosystems*

**WO 2024/094577 A1 (CPC D04B 1) protects not only the technology itself, but also the strategic foundation for the production of scalable, self-adjusting apparel in the world's leading luxury and technology markets.**

This patent secures enforceable rights across key global jurisdictions, safeguarding the innovation both technically and commercially. The protection it provides goes beyond the method itself, encompassing the entire commercial opportunity it defines, including the **underlying FIT logic, the product, and its applications.**

### Coverage Overview:

- **Jurisdictions Covered**  
Europe (EP), United States (US), China (CN)
- **Global Reach**  
≈ 2.19 billion people (~ 27% of global population) – within jurisdictions covered by active patent protection
- **Commercial Relevance**  
Covers ~ 80–89% of global apparel market spending – spanning design, production, and high-tech apparel ecosystems
- **Positioned for Next-Generation Growth**  
Patent aligns with emerging AI-powered design systems and adaptive garment innovation
  - China: 70% of global AI-related filings in 2025
  - US: #1 in patent grants
  - Fully compatible with AI × Structural design integration.

- **This framework ensures technical exclusivity and commercial defensibility in all relevant territories for any future developments.**

#### Further Legal and Structural Details:

For Patent Abstract: See **Page 63**

For comprehensive legal positioning, structural protections, and enforceability pathways, see: **Chapters 19, 20, 21, 29, 30**

### 3. Global Validation & Market Positioning in Structural Apparel Innovation

*Novel Discipline: Advanced FIT Architecture for Integrated Apparel Systems*

**WO 2024/094577 A1 · CPC D04B 1 (Priority Date: 2 November 2022)** represents one of the most significant structural innovations in programmable knitwear – introducing **the first apparel system capable of delivering perfect FIT at an industrial scale, based on the application of mechanical laws to internal garment panel correlations.**

The **outcome is an unlimited number of perfectly fitting garments** of any type, which can be designed and manufactured using most fibres available on the market, without the need for external components to achieve a perfect FIT. Example in Chapter 28 (*Diagram 2, Page 79*) illustrates one implementation of inter-panel coordination within the system.

#### PCT-Level Recognition

The invention was officially recognised as structurally novel during the international PCT examination process. Among the references reviewed was publication **WO2016018904A1 · CPC D04B 1** · Applicant: NIKE Innovate C.V. · Inventor: MEIR, Adrian (Published: 4 February 2016). The citation confirms that the claims of this invention were tested against a high-impact prior art document and were deemed to be structurally original and independently defensible. This validates the strength of the invention in terms of both mechanical and legal novelty.

#### Structural Significance – Only Two Examiner-Cited Publications in the WO2016018904A1 Cluster

WO2016018904A1 has since become one of the core citations within the field of structural knitwear innovation. Of the more than 50 patented inventions associated with its citation cluster, only two publications were formally cited by international patent examiners as structurally novel:

- **WO2023069764 A3** · Applicant: **NIKE Innovate C.V.** · Filed: 13 July 2021 · Published: 13 July 2023 · **Focus:** Footwear
- **EP4365344 A1** · Applicant: **NATALIYA DOLENKO GENEVE SA** · Filed: 2 November 2022 · Published: 8 May 2024 · **Focus:** Scalable, self-adjusting tailored apparel enabled by mechanically based inter-panel logic – delivering real-time **adaptive FIT** across the entire garment through engineered mechanical principles

#### IP Milestone

These citations confirm the structural independence and field-level significance of the current invention. **WO 2024/094577 A1 (Priority over: EP4365344A1 · Priority Date: 2 November 2022)** is positioned among the highest-recognised inventions within the structural knitwear engineering domain – affirming its technical distinction and structural importance within the field.

The invention establishes an original, protected structural framework that is not affiliated with any prior art – and **defines a novel discipline: Advanced FIT Architecture for Integrated Apparel Systems.**

## 4. Invention Scope and Structural Patent Coverage in Plain Terms

WO 2024/094577A1 secures the only legally enforceable principle, method, and product grounded in mechanical interdependence – enabling garments to self-adjust and deliver perfect FIT at scale. In doing so, it establishes a structurally novel, legally protected discipline:

### Advanced FIT Architecture for Integrated Apparel Systems

**Focus: Self-adjusting, fully tailored apparel** – the only legally protected method known to enable **scalable FIT** across anatomical diversity through **mechanically based inter-panel logic**.

This patented method is rooted in **structural engineering** and is not dependent on specific materials, aesthetic shaping, or zonal reinforcement. It transforms tailoring from static to responsive, creating a fully integrated system in which **structure governs FIT**.

Importantly, this patent does not protect a particular outcome in terms of appearance – it protects the underlying **Structural FIT Logic** that enables functional capability at scale.

In this context, shaping is not a visual objective, but the outcome of **mechanically governed panel interdependence**.

FIT emerges through activated structural correlation, producing a dynamic balance between adaptability and form.

The essence of the protected invention lies in how the structure performs, rather than how it appears.

The **Structural FIT Logic** is:

- **Engineered** – not based on apparel styling or material science.
- **Enabled by programmable systems** – not sensors, elastics, or post-production modification.
- **Technology-agnostic** – scalable across all existing 2- and 4-bed programmable knitwear platforms.
- **Execution-ready** – pre-programmed constructions require no additional R&D and operate on standard industrial knitwear protocols.

The outcome: an engineered dynamic FIT – not by approximation.

The core patent describes the functional outcome achieved that enables self-adjustment:

*"The garment does not require fastening devices, making it self-adapted to each wearer – while retaining pre-designed structural stability."*

(WO2024094577A1)

## Core Novelty

- **Mechanically based inter-panel logic** as the foundation of **Structural FIT Logic**
- Predictive response to body movement through engineered deformation – enabling self-adjustment synchronised with simultaneous **targeted reinforcement** for stabilisation within **Preset Constructions**
- Seamless integration of tailored precision into programmable knitwear technologies – enabling real-time adaptive FIT at scale
- Expanded sizing coverage across adjacent sizes – eliminating the need for fragmented, fixed-size manufacturing systems
- Merger of structurally tailored outcomes with scalable, efficient, high-quality production
- Transition from zonal or support-based FIT toward fully self-governing **Preset FIT Constructions**

→ **The outcome is a system that redefines FIT as a programmable structural property – enabling scalable precision in both self-adjusting, mechanically governed tailoring and production quality using existing industrial infrastructure.**

By embedding **structural intelligence** directly into the construction logic, this invention replaces fragmented processes, operator dependency, and aesthetic FIT approximation – introducing, in their place, a legally protected, mechanically governed **Advanced FIT Architecture**.

## Scope of Protection Preview

The system's legal protection applies not only to its functional outcomes, but also to the underlying **structural geometry** that enables them.

Any automated knit construction – incorporating geometric or **freeform panels** – where at least one edge is positioned at an angle relative to the knitting direction, falls within the protected framework. This includes **bias-oriented panel configurations**, as precisely defined within the patented system, covering any angular deviation from perpendicular alignment to the knitting direction.

**Note:** While the term *bias* in woven garment engineering typically refers to a 45° orientation known for its ability to create fluid drape, within the present invention, **bias-knit configurations are legally defined to encompass a full spectrum of angular deviations from the knitting direction**. These configurations – whether subtle or pronounced – are structurally integrated into the garment through a precise, programmable system. Combined with embedded reinforcement structures, this approach enables tailored shaping, structural stability, and scalable production consistency.

The invention secures the full range of **angular panel configurations** defined within the patented construction logic – providing a legally protected pathway to responsive, self-adjusting garment behaviour at scale.

*Detailed legal scope and protected principles are outlined in Chapters 10, 12, 16, 19, 20, 21 & TECH DEEP DIVE Second part of this document.*

# Engineering Foundations & Structural Logic of Advanced FIT Architecture

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Advanced FIT Architecture redefines how FIT is engineered, replacing subjective, reactive tailoring with a logic-driven, structurally embedded system. At its core lies Structural FIT Logic – a mechanical framework where angular panel alignment, targeted reinforcement, and controlled deformation deliver real-time, self-adjusting FIT. This approach eliminates dependence on grading, alterations, elastics, or AI prediction, embedding adaptive shaping directly into garment construction at scale.

The method merges disciplines including tailoring logic, structural geometry, mechanical engineering, and programmable knitwear technology into a unified system for scalable, responsive tailoring. Structural mechanics are translated through spatial geometry into a pre-programmed architecture, ensuring precise, repeatable FIT across garment types without post-production correction. Aesthetic calibration and tailored shaping are no longer dependent on manual processes but are structurally guaranteed through engineered deformation logic.

This system establishes a new category within apparel engineering: **Advanced FIT Architecture for Integrated Apparel Systems**. It governs the entire process – from design to scalable production – providing a proven, legally protected foundation that replaces fragmented tailoring methods with logic-based, self-adjusting adaptability. The result is scalable, visually precise, and structurally stable garments that adjust to the wearer's body in real time.

By integrating structural mechanics with machine-executable logic, this method changes the way garments are designed, manufactured and worn. It overcomes long-standing FIT challenges by providing a system that can be implemented immediately to achieve tailored outcomes on a large scale, with structural precision, operational efficiency and aesthetic integrity engineered directly into the garment itself.

For technical teams requiring structural specifics, see **Technical Deep Dive, Chapter 23** onward.

## 5. Advanced FIT Architecture for Integrated Apparel Systems

*The Structural Method Redefining Scalable, Self-Adjusting Tailored Apparel*

---

### What is Advanced FIT Architecture?

**Advanced FIT Architecture is a principle, a method, and a category of products** that redefines how **FIT is engineered** by embedding **Structural FIT Logic** directly into any garment construction, regardless of type. It is not a styling system but a structural method based on **mechanical principles**, enabling scalable, responsive apparel across multiple applications.

### Scope and Components

This new category encompasses:

- Engineered apparel products with integrated, self-adjusting FIT
- Programmable and scalable garment production systems
- Structural engineering frameworks enabling dynamic shaping and FIT
- Operational methodologies for mass customisation without bespoke processes
- Lifecycle management systems for adaptive, sustainable apparel
- Smart apparel ecosystems combining design, manufacture, and end-use adaptation.

It introduces:

1. **A new discipline within apparel engineering – *Advanced FIT Architecture for Integrated Apparel Systems***, built on mechanically adaptive panel logic.
2. **A universally applicable logic – *Structural FIT Logic***, making scalable, precise FIT structurally programmable rather than relying on grading, trial, or manual correction.
3. **A *Methodological Framework* for self-adjusting construction** – a logic-driven system for engineering controlled structural behaviour.
4. ***Automated FIT Systems*** – replacing manual sizing, alterations, and AI prediction models with pre-programmed, mechanically responsive structures. This market-defining category is not limited to garments; its principles can be applied to any form or system in which the structure must adapt to its physical context. → Once the **core structural principles** have been met, an **unlimited number of configurations can be developed**.

The invention introduces a new **Structural FIT Logic** – replacing reactive, manual tailoring with a scalable, engineered system that enables simultaneous shaping and real-time adaptability within garment construction. This establishes an entirely new category: **Advanced FIT Architecture for Integrated Apparel Systems** – where tailored precision is translated into an **inherent structural property**, applicable across mass-market production without reliance on individual adjustment or customisation.

## Structural Engineering Redefined

It defines a new class of structural garment engineering – one that guarantees results through **structural certainty**:

- Without reliance on static tailoring
- Without dependence on generic stretch
- With programmable, self-adjusting properties embedded directly through internal architecture

## Industry Impact – Scalable, Responsive Tailoring

The result is **scalable, responsive tailoring** – executed with precision, engineered from the inside out. By offering a clear structural logic for delivering responsive shaping with the precision of bespoke tailoring, but at mass scale, the method provides the industry with:

- A stable foundation to build on
- A shared standard that accelerates innovation
- A licensable system that removes uncertainty

## Practical Outcomes

- Elimination of wasted R&D on unsolvable FIT challenges
- Clear legal certainty without ambiguity or grey zones
- A proven, ready-to-implement system, delivering structure, scalability, and security

## FIT Governance: Structural Mechanics Executed Through Structural Geometry

The patented method translates **mechanical principles** – force distribution, deformation thresholds, and angular interaction – into pre-programmed garment structures through **Structural Geometry** which carry the method's **Structural FIT Logic**.

**FIT** is not as a subjective experience – it is a structural outcome pre-engineered, repeatable, built directly into the physical logic of the garment. Every panel, curve, and **targeted reinforcement** serves a mechanical function, enabling garments to self-adjust and maintain tailored precision under dynamic conditions.

## This means:

- **Structural Mechanics** are enacted through geometric configuration
- **Geometry** becomes the physical vehicle for adaptive logic, enabling:
  - **Scalability**
  - **Visual Calibration**
  - **Motion Integrity**

*"Thanks to embodiments of the present invention however, with the contribution of aspects described above, the extra stretch and flexibility and adaptability required is achieved precisely at places on the garment where it is required." (WO2024094577A1)*

**This is not a barrier → It is a blueprint.**

## 6. Structural FIT Logic as Aesthetic Calibration

*Predictive, Pre-programmed Visual and Structural Outcomes Governed by Mechanical Law*

This invention does not **approximate FIT** –

→ it **dictates** it, with **built-in certainty**.

The aesthetic outcome is **structurally pre-calibrated** –

→ not left to subjective evaluation or post-production correction.

Through **mechanical configuration** – **angular panel alignment, targeted reinforcement**, and controlled deformation – the method predetermines both form and **structural behaviour**.

Whether targeting fluid minimalism or sharp tailoring, the result is not reactive –

→ it is a **structural certainty, engineered to deliver both visual and dynamic precision in advance**. In brief:

→ **Form Follows Function**

→ **& Function is Dictated by Mechanical Law**

**Disciplinary Chain of Execution:**

**Structural Geometry** (*Mathematics*)

→ Defines spatial configuration and angular relationships

↓

**Mechanical Law** (*Physics*)

→ Governs deformation thresholds, force distribution, and structural interaction

↓

**Advanced FIT Architecture** (*Invention*) – **System for self-adjusting apparel**

→ Delivers visual and functional precision through pre-programmed construction of self-adjusting garment

↓

**Programmed to Scale** (*Computer Science*)

→ Executes Structural FIT Logic through programmable knitwear technologies at industrial scale

**Visual Summary of the Chain of Execution of Advanced FIT Architecture** *Diagram 1:*



→ **Structural Geometry** (*Mathematics*) → **Mechanical Law** (*Physics*) → **Apparel Engineering** (*Apparel Aesthetics + Engineering + Computer Science*) → **Self-adjusting Garment Output** (*Invention*) → **Programmed to Scale** (*Computer Science*)

*This is where adaptive behaviour becomes a structural feature, embedded into the material logic of the garment – producing tailored outcomes with unprecedented consistency, repeatability, and scale.*

## 7. Foundational Domains

*Disciplines the Patented Method Draws From*

→ **Tailoring Principles of FIT** (*Apparel Aesthetics + Anatomy*)

Draws from anatomical proportion logic used in couture tailoring – translated into pre-programmed constructions, eliminating manual adjustment.

→ **Structural Geometry** (*Mathematics*)

Defines panel configuration, spatial relationships, and angular logic – establishing the structural foundation of adaptive garment architecture.

→ **Mechanical Engineering** (*Physics*)

Governs force distribution, deformation behaviour, and angular motion – including the role of gravity in stabilising structure against the body – enabling dynamic FIT through physical law.

→ **Apparel Engineering Science** (*Apparel Aesthetics + Engineering + Computer Science*)

Combines geometric and mechanical principles into a wearable, self-adjusting system – achieving body-mapped shaping with engineering precision.

→ **Programmable Knitwear Technology** (*Computer Science*)

Provides the industrial execution platform – applying **Structural FIT Logic** at scale through 2- and 4- bed programmable systems.



**Newly**

**Established  
Paradigm:**

→ **Advanced FIT Architecture** (*Integration of All Domains Above*)

Synthesises **Structural Geometry**, **Mechanical Law**, and tailoring principles into a pre-programmed, self-adjusting system. Embeds **FIT** precision, silhouette control, and motion responsiveness directly into garment form – eliminating the need for manual adjustment.

## 8. Methodological Framework

*How the System Functions: Tailoring Precision Without Tailoring Dependency*

→ **Grounded in Structural Geometry** (*Mathematics*)

Establishes angular panel interplay and spatial configuration as the foundation of adaptive behaviour.

→ **Governed by Mechanical Law** (*Physics*)

Enables predictive force distribution, load-bearing control, and deformation logic within the structure.

→ **Advanced FIT Architecture – Without Tailoring Dependency**

Replaces grading and patterning with logic-based, self-adjusting adaptability engineered into garment construction.

→ **Executed via Programmable Knitwear Technologies**

Delivers **Structural FIT Logic** at scale through 2- and 4-bed systems programmable platforms – eliminating the need for post-production adjustment.

## 9. Interdisciplinary Foundations of the Method Explained

*The Synthesis of Tailoring, Engineering, and Computer Science into Scalable Apparel Systems*

### With the Foundations in:

→ **Tailoring & Pattern Logic** (*Apparel Aesthetics + Anatomy + Pattern Making + Draping as Spatial Pattern-Making*)

Provides the essential understanding of body shape, proportion, and structural shaping – including panel movement, darts, and balance techniques. Tailoring defines how the body is perceived, combining technical precision with an understanding of material behaviour and visual alignment. It shapes structure in harmony with fabric properties and body proportions – making it a high form of applied spatial intelligence in apparel. No generalised size system can reflect the anatomical diversity. This method systematises tailoring intelligence – making it programmable and scalable without losing its intent.

→ **Structural Geometry** (*Mathematics*)

Establishes the spatial logic of panels and angular configurations – forming the backbone of adaptive structure.

→ **Mechanical Engineering** (*Physics*)

Controls how deformation, tension, and gravity interact – enabling movement-based structure that adapts to motion and load.

### Landing in Technological Landscapes of:

→ **Engineering** – Establishes the mechanical foundation for **structural behaviour** – including adaptive panel interaction, load response, and stability. The principle of movement-based structure is universally applicable across wearable and non-wearable forms requiring dynamic behaviour.

→ **Apparel & Textile Engineering** – Applies these principles specifically to human wearables – translating **structural logic** into material response through stitch behavior, tension mapping, shaping techniques, and fiber dynamics. This enables precision FIT across garment categories, climates, and complexity levels.

→ **Computer Science** – Enables scalable programmable execution. **Structural FIT Logic** becomes machine-readable, digitally replicable, and automatable. Algorithms ensure process control and exact replication across units – delivering precision FIT without deviation, at any scale, in any production setting.



→ **Advanced FIT Architecture for Integrated Apparel Systems** (*Synthesis Layer*)

The result is a new, unified framework – replacing conventional size systems and tailoring manual work with embedded, logic-based adaptability.

## The Secured Structural Logic – Locked Pathway, Technical Exclusivity, and Industry Application for Scalable, Self-Adjusting Tailored Apparel

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The patented invention secures the only mechanically viable foundation for scalable, self-adjusting, tailored apparel – applicable instantly to existing technology infrastructures. By embedding **Structural FIT Logic** into garment construction, the system enables real-time adaptability through angular panel alignment and targeted reinforcement – without elastics, sensors, or customisation.

Protected in both basic and advanced forms, the method locks all viable mechanical pathways to achieving scalable, adaptive FIT. It governs geometric and freeform panels engineered to trigger controlled deformation, directional shaping, and real-time self-adjustment.

Unlike additive design or stretch-based solutions, this system achieves **true structural integration**, making self-adjustment an inherent, pre-programmed property – stable, repeatable, and scalable across body types, garment categories, and production volumes.

**The novelty lies in the engineered interplay of angular behaviour and reinforcement – delivering tailored precision, structural stability, and adaptability through mechanical logic alone.**

**This logic applies universally. Its governing function is independent of application domain. Whether apparel, medical, or performance sectors, the system delivers the same scalable, structurally governed outcome.**

## 10. Angular Inevitability – The Legally and Technically Locked Foundation of Self-Adjusting Tailored Apparel

*The Only Viable Route – to Self-Adjusting Tailored Apparel*

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The patent protects any automated knit construction within CPC D04B1 involving:

- Any combination of panels – **geometric or freeform** – in which **at least one edge forms an angle** relative to the knitting direction, including but not limited to bias orientation (*which, in practice means securing all directional shaping through angular interrelation*) with the purpose of triggering mechanical self-adjustment through inter-panel correlation,
- Any such angular panel configuration within a programmable system that **mechanically triggers self-adjustment** through **inter-panel correlation**, incorporating **targeted reinforcement** structures comprising:
  - A minimum of three consecutive rows knit in the same direction, or
  - Yarn with greater stiffness than the yarn used for knitting the adjacent knit fabric panels,

➤ falls within the protected scope, whether used for shaping, flexibility, motion, or structural stability.

### Illustrative Structural References from the Patented Invention

*"...create a garment which would give a tailored fit look when worn by different people having quite different body shapes... while ensuring sufficient support to maintain its form. "*

*"...a plurality of knit fabric panels of geometric or freeform shape having at least one edge... enabling shaping and flexibility. "*

*"...elongate reinforcement structures... providing superior structural stability to the adjoining knit fabric panels, aligning them to the wearer's body. "*

(WO2024094577A1)

### Structural Exclusivity Confirmed by Structural Logic

The mechanical movement required for real-time self-adjustment – combined with simultaneous shaping and **targeted reinforcement** – arises from the engineered correlation between panels, governed by two essential structural elements:

- Angular panel behaviour
- Reinforcement structures

Only through the deliberate, engineered interaction of these two principles can a self-adjusting, tailored garment of any type be achieved.

## Clarification of Freeform

This method embeds both into any garment type – including **freeform**\* panel configurations, as defined in the core patent – enabling structural self-adjustment as an inherent, pre-programmed outcome.

### \* *Freeform*

Only through the deliberate, engineered interaction of these two principles can a self-adjusting, tailored garment of any type be achieved. This method embeds both into any garment type – including *freeform* panel configurations, as defined in the core patent – enabling structural self-adjustment as an inherent, pre-programmed outcome:

*"The term 'freeform', as used here, is merely to indicate that the shapes are not shapes that can be defined by a mathematical equation, as would be the case for geometrical shapes. The term 'freeform' does not however mean that the shapes can be freely drawn at random. Neither does it indicate that the shapes may be those which readily appear in nature. "*

*"On the contrary, the freeform shapes referred to in the context of the present invention are shapes which have been designed expressly by a skilled tailor so that when knit fibre panels having those shapes and knit fibre elongate structures are combined according to the predetermined knitting instructions, they form the desired three-dimensional tailored garment."*

(WO2024094577A1)

## Structural Logic in Practice – Behavioural Examples

### a. Angular Coverage for Self-Adjustment (0°–360°):

As defined within the core patent, any deviation of a panel edge from perpendicular alignment to the knitting direction, or to the orientation of the majority of stitches within that particular panel, implies a degree of bias – regardless of how subtle or pronounced the angle.

A pure bias at 45° represents only one example within a continuous range of functional angular configurations.

Due to the rotational and reflective symmetry inherent to knit fabrics, angular positions represent mirrored or rotational equivalents governed by the same **Structural FIT Logic**.

By securing any angular deviation from the selvage or main knitting direction, complete 360° structural coverage is logically and mechanically embedded – no direction remains structurally unaccounted for.

### For example:

- The 45° angle – along with its rotational or mirrored equivalents – represents the most mechanically unstable zone within any structure, providing the greatest potential for self-adjustment to occur.
- In contrast, a 15° angle introduces relative structural stability while still allowing for controlled deformation, depending on overall construction, adjoining panel configuration, and targeted reinforcement distribution.

The structured combination of freeform panels, angular panels, and targeted reinforcement elements within the same garment enables precise control across the full spectrum of flex, shift, stretch, and deformation – while maintaining the stability and shaping required for tailored outcomes.

The same **Structural Logic** applies regardless of garment type, stitch pattern, yarn selection, or industry sector.

#### b. Reinforcement and Tailoring – Minimum Structural Definition:

- The patent defines not just elaborate reinforcement, but the **minimum viable architecture** required to visibly and functionally produce tailored shaping.
- Any attempt to scale down, scale up, or otherwise modify the **Structural FIT Logic** – for example, inserting fewer reinforcement rows, altering yarn composition, or reducing panel overlaps – still falls under infringement, as the protected core **Structural Logic** remains unchanged.
- This **targeted reinforcement** actively governs load distribution, fabric memory, and inter-panel balance – all essential for achieving tailored shaping without cut-and-sew techniques.x

### Complete Functional Domain

The patented invention secures the entire mechanical domain for scalable, self-adjusting knitwear:

- All directional shaping through angular interrelation – enabling adaptive, responsive movement
- All reinforcement levels required for tailoring – achieving silhouette control and structural shaping
- All forms of real-time adaptation – without reliance on external mechanisms such as sensors, fasteners, or manual adjustment

Together, these elements form a fully enclosed system. No alternative mechanical pathway remains for achieving scalable, self-adjusting tailored apparel in programmable knitwear – the **Structural FIT Logic** required to do so is fully protected.

### Structural Exclusivity Confirmed

*"Garments designed according to embodiments of the present invention... remain stable even though they include panels designed to be worn with the bias grain line. This is achieved by the combination of panels... under the angle creating a more fluid, stretchy fit, joined to panels... extremely narrow and tight fitted... joined to the very stable and central front panel."*

(WO2024094577A1)

## 11. Structural Integration – Not Additive Enhancement

*A Fully Unified Garment Architecture Replacing Fragmented, Feature-Based Solutions*

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Most structural engineering developments in knitwear have been additive in nature – introducing functional zones to assist movement or provide support often within specific product categories such as compression garments and footwear.

This method, by contrast, achieves true **structural integration**. It merges the **Structural FIT Logic** required to deliver tailored results through mechanically governed material responses – embedding adaptability and shaping directly into the garment’s architecture.

It defines not only a principle but the **minimal viable structural configuration** necessary to achieve dynamic shaping and self-adjusting FIT at scale.

This is not a feature layered onto existing garment constructions – it is a legally protected **Structural Logic**, enforceable in both its full application and its foundational minimum:

- Defined by **angular panel alignment**
- Stabilised through **targeted reinforcement**
- Executed through **mechanically based inter-panel logic**
- **Seamlessly integrated within fully yarn-based, structurally governed programmable garment manufacturing**

*"...that when knit fibre panels having those shapes and knit fibre elongate structures are combined according to the predetermined knitting instructions, they form the desired three-dimensional tailored garment. "*

(WO2024094577A1)

Rather than adapting to the industry’s fragmented systems, this invention provides a **unified framework** for an **entire garment construction** – one that the industry can now align with, scale, and trust.

**Every mechanical pathway required to achieve self-adjusting, tailored knitwear has been secured.**

## 12. Novelty over Prior Art

### *Structural Logic, Shaping, And Self-Adjustment that Surpasses Conventional Knitwear*

The invention's novelty lies in its combination of **structural stability**, **shaping**, and **self-adjustment** within a single garment construction, produced through **programmable knitwear technologies** solely reliant on **mechanical principles**. The result is achievable using a **single type of yarn**. This creates a dynamic balance between tailored shaping to the wearer's body and enabling a **self-adjusting FIT**.

While prior art in programmable knitwear focused on:

- **Zonal functionality** – such as compression, support, or performance areas
- **Aesthetic shaping** – creating visual effects without structural change
- **Local adjustments** – such as fléchage, gores, or tension tweaks
- **Reliance on external mechanisms** – such as fasteners, sole-based logic, or 3D-printed inserts

This invention introduces a **logic-based FIT architecture**, in which **structure**, **shaping**, and **adaptability** are engineered together from the outset.

It simultaneously achieves:

- **Internal logic** that replaces patterning with **structural shaping**
- **Self-adjusting FIT** with no external support
- Eliminated bias-panel collapse through controlled angular panel movement, harnessing its full potential for self-adjustment
- A complete framework in which **Structural Logic** actively governs form and **FIT**

*"The function of the elongate reinforcement structures mentioned above is to provide structure and support to the garment, helping to align contours of panels which abut with the reinforcement structure with the shape of the body to which the garment is intended to fit. They ensure that the panels maintain the required placement against the curves of the body."*

(WO2024094577A1)

It is not simply programmable FIT or tailored FIT – **it is an engineered system designed to adjust to virtually any individual, with all elements working together seamlessly from the start, regardless of fibre, garment type, industry application, or styling design.**

## 13. Cross-Domain Application of the Patented Principles

### – Relationship to Existing Engineering Fields

*Enabling Scalable, Adaptive Systems Across Apparel, Medical, Performance, and Smart Textiles*

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While the invention is structurally and legally distinct, it can be integrated across multiple domains without fitting neatly into any pre-existing category. Its systemic adaptability supports and enhances a wide range of disciplines:

- **Conventional Wearable Engineering**

The method supports integration with established wearable applications – including garments designed for comfort, longevity, and passive body support – by providing a self-adjusting structural base that enhances both functionality and wearability.

- **Advanced Wearable Engineering**

The method is fully compatible with the development of sensor-based or medical monitoring garments. By enabling garments to self-adjust and maintain stable FIT around target zones, it provides an optimal structural platform for embedding electronic components – especially in clinical, athletic, or remote diagnostics environments.

- **Apparel Engineering**

The method redefines how garments are constructed at scale – offering a new engineering model for large scale production of tailored apparel that eliminates cut-and-sew, reduces waste, and achieves **mass-market perfect FIT** through **programmable knitwear**. It provides an engineering standard for reshaping how garments are planned, prototyped, manufactured, and quality-controlled.

- **Fashion Engineering**

The method supports full creative flexibility for new designs while guaranteeing **functional FIT at scale**. Designers are free to create new silhouettes or aesthetics while relying on an embedded **Structural FIT Logic** that adapts to the wearer's body – enabling fashion innovation with predictable, wearable outcomes.

This cross-disciplinary utility underscores the invention's **structural independence** – reinforcing its role as a **foundational enabler** for the next generation of engineered apparel, **capable of delivering dynamic FIT at unlimited scale**.

## 14. Key Market Applications

### *Strategic Sectors and Product Categories Structurally Enabled by Embedded Logic*

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The patented method is based on a universally applicable correlation between movement and reinforcement – enabling **real-time self-adjustment** and structured tailoring directly within the garment’s construction through embedded **Structural FIT Logic**. **This principle applies wherever garments are required.**

The following categories represent the primary sectors where the method is most strategically and functionally positioned – particularly in contexts requiring **dynamic FIT**, **structural responsiveness**, and **scalable precision**:

- **Apparel (Fashion & Mass-Market)**  
Seamless FIT and adaptive structure across all garment types – delivering tailored precision at full industrial scale.
- **Medical Wearables**  
Therapeutic garments – providing responsive support, precise pressure distribution, and anatomical adaptability.
- **Performance/Sportswear**  
Garments engineered for high-mobility use – combining dynamic shaping, real-time compression, and responsive structural behaviour.
- **Industrial/Occupational**  
Task-specific workwear integrating durable, ergonomic structuring – optimised for demanding environments and extended wear.
- **Smart Textiles & Wearables**  
Structural foundations for sensor-integrated garments – enabling real-time feedback, adaptability, and compatibility with future AI-driven systems.

### **Fields of Functional Application**

These represent the **structural domains** in which the method’s embedded **Structural FIT Logic** delivers its intended outcomes – independent of commercial labels or market-facing classifications:

- **Apparel** – Including fashion, luxury, casual, formal, and mass-market wear.
- **Medical Garments** – Orthopedic, therapeutic, assistive, and recovery-based structures.
- **Performance/Sportswear** – Kinetic-responsive, compression-based, and load-distributing designs.
- **Industrial/Protective Clothing** – Uniforms, PPE, and gear requiring structural integrity and performance.
- **Smart Textiles & Wearables** – Garments built to structurally accommodate sensors or responsive systems.

## Impact Beyond FIT – Structural Advantage, Market Exclusivity, Real-World Scalability

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This section defines how the patented method extends far beyond FIT correction – establishing the only legally protected, scalable system for self-adjusting, structurally tailored garments. Through embedded Structural FIT Logic, the system delivers not just scalable precision, but new product categories, structural exclusivity, and market control.

Replacing fragmented sizing and manual tailoring with engineered, mechanically governed construction unlocks adaptive support garments, posture-assist fashion and discreet shaping, all without relying on medical classification, electronics or external components.

Structural complexity can be flexibly scaled – from mass-market efficiency to luxury-level precision – within the same protected framework. Each product tier remains structurally consistent, legally exclusive and operationally efficient.

This is not software, sensors or design – it is a mechanical foundation that competitors cannot bypass. It secures the only viable route to scalable, self-adjusting apparel, locking in the structure, the market and the future.

## 15. From Invention to Industry-Scale Impact

*Quantified Systemic Replacement of Sizing, Tailoring, and Production Inefficiencies*

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### Introduction: Why Scale Demands Structure, Not Approximation

The patented system represents a structural reset. By replacing approximation with engineered precision, it enables what no legacy approach has achieved: scalable, self-adjusting, tailored garments, produced with structural certainty, across mass, luxury, performance, and industrial markets.

Critically, this impact is not theoretical. **It is proven, hardware-compatible, and legally protected.** Every operational, commercial, and environmental improvement stems from a single source – the replacement of fragmented garment logic with a unified, **mechanically governed system.**

### The System-Level Foundation: Why Structural Detail Dictates Industry Outcome

True scalability requires more than digital tools or surface-level design. It requires structural foundations precise enough to behave predictably across millions of garments, yet flexible enough to accommodate real-world diversity.

The patented method achieves this by embedding **Structural FIT Logic** – an engineered system based on:

- **Angular Panel Logic** – Governing deformation and shaping through mechanically controlled angles, not by approximation or generic stretch.
- **Reinforcement Structures** – Distributing mechanical stability across garments, eliminating deformation and maintaining form over time.
- **Interdependent Panels** – Ensuring each element adapts in relation to others, delivering dynamic fit and structural integrity in motion.

These principles, rooted in mechanics and Structural Logic, are what transform seemingly small technical details – angles, tension distribution, reinforcement zones – into the foundation for predictable production, waste elimination, and long-term garment performance.

### What This Enables at Scale

The system transforms garment engineering from a fragmented, reactive process into a predictable, systematised infrastructure for scalable FIT – resolving legacy inefficiencies across production, logistics, and sustainability:

- Outdated sizing logic, manual tailoring, and elastic-dependent construction are replaced by a unified system for self-adjusting FIT.
- Structural Logic is embedded directly into garment architecture – eliminating approximations and delivering repeatable, scalable precision.

- The result is a legally protected, production-ready framework that combines tailored precision, waste reduction, and simplified operations – without the need for personalisation infrastructure or design limitations.

**Input → Output → Feedback → Regulation → Deviation Management**

| Stage                | Description                                                                        |
|----------------------|------------------------------------------------------------------------------------|
| Input                | Real-world unpredictability, broken FIT logic, industrial waste                    |
| Output               | Structural certainty, executable programs, traceable logic                         |
| Feedback Loop        | Real-world performance data drives refinement ( <i>covered by NDA agreements</i> ) |
| Regulation           | Access governed by patented method + program-based licensing                       |
| Deviation Management | Zero-deviation FIT architecture enables consistent outcomes at mass scale          |

**Systemic Problems Resolved by CORRMETH<sup>TM</sup>**

- FIT unpredictability and inventory distortion
- SKU overload driven by fragmented sizing systems
- High-cost personalisation infrastructure
- Labour-intensive tailoring and post-production adjustments
- Environmental and logistical waste, including CO<sub>2</sub> emissions

**From Approximation to Architecture**

**Replaces:**

- Static sizing and manual tailoring
- Grading systems unable to accommodate real anatomical variation

**Delivers:**

- Self-adjusting garments engineered for motion, with a market expansion coefficient of **2.67**
- Structural intelligence and predictable FIT at scale

**How it Works:**

- **Embedded angular panel alignment** enables controlled deformation for self-adjustment – without compromising form
- **Each garment construction spans ± 1.5 sizes from its design base** (e.g., a build between 38/40 IT fits 36–42 IT) – achieved through structural adaptation, not generic stretch

Limitations of Conventional Tailoring at Scale

| Limitation                             | Structural Consequence                                        |
|----------------------------------------|---------------------------------------------------------------|
| Pattern grading built on 2D logic      | Cannot accommodate 3D body movement or shape diversity        |
| Manual adaptation processes            | Non-repeatable, labour-intensive, inconsistent results        |
| Structural rigidity of woven tailoring | Close to zero dynamic shaping, excludes movement adaptability |

Systemic Operational Gains with the Method

- Design, development, and production unified within a single Structural Logic framework
- No personalisation tools, body scans, or manual alteration chains required
- Pre-programmed FIT across product categories – simplifying operations, reducing overhead
- Mono-material construction streamlines recycling and circularity at end-of-life

Market Replacement and Scalable Power

Structural advantages over woven and cut-and-sew systems:

| Conventional Systems                       | CORRMETH <sup>TM</sup> Advantage                                                                       |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------|
| No dynamic shaping                         | Dynamic FIT through self-adjustment, covering up to 4 adjacent sizes                                   |
| FIT logic not transferable across products | High tailoring quality from €100 to €1,000+ which is based on panel complexity, not equipment upgrades |
| Labour dependency remains                  | Seamless scalability – 1 operator for up to 50 machines                                                |
| Rigid size structures require constant R&D | 3-size production replaces 8 SKUs – no extra equipment required                                        |

CORRMETH<sup>TM</sup> Market Segments and Product Categories

The patented method applies across multiple industries:

- **Apparel** – Mass-market to luxury
- **Medical** – Orthopaedic, posture-correcting, pressure-calibrated garments
- **Sportswear** – Adaptive compression, ergonomic shaping
- **Industrial Applications** – Reinforced garments for specialised work environments

Built-in Logic Replaces Fragmentation:

- One programme → multiple outcomes
- Pre-programmed structures reduce prototyping cycles
- Mono-material structure simplifies recycling and circularity

## Strategic and Quantified Impact

### Cascading System Benefits – Structurally Caused, Not Coincidental:

**Pre-programmed FIT → Reduces Sizing Approximations → Eliminates Excess SKUs → Improves Recyclability → Reduces CO<sub>2</sub> and Waste**

| Metric                                                   | Impact                                     |
|----------------------------------------------------------|--------------------------------------------|
| Unsold Garments Due to Size Mismatch                     | ↓ <b>78.6%</b>                             |
| Returns Reduction Potential                              | ↓ <b>71.4%</b>                             |
| Yarn Recovery (solely reliant on mono-yarn construction) | ↑ <b>85.0%</b>                             |
| CO <sub>2</sub> Emissions Reduction per Garment Produced | ↓ <b>68.4%</b>                             |
| Waste Reduction per Garment Sold                         | ↓ <b>84.9%</b>                             |
| Labour Requirements                                      | ↓ <b>Up to 99.9% (1/50 Highly Skilled)</b> |
| Production Time Reduction                                | ↓ <b>84.0%</b>                             |

## Compounded System-Level Efficiency

The patented system delivers measurable efficiency gains in production time, material use, CO<sub>2</sub> emissions, and waste reduction – with verified improvements of up to **68.4%** CO<sub>2</sub> reduction per garment produced, or **72.0%** when recycled fibres are applied. These reflect only the direct improvements achievable at the manufacturing stage.

By structurally reducing size-driven unsold garments, minimising production waste through mono-material seamless construction, and enabling circular fibre recovery, the system generates compounded savings that extend well beyond production. The combined impact delivers substantial reductions in raw material use, energy consumption, transport volume, waste generation, CO<sub>2</sub> emissions, and end-of-life disposal – exceeding isolated production-stage efficiencies by structural design.

## Why CORRMETH™ System Wins

- Replaces approximation with structural certainty
- Proven, operational, and compatible with existing high-tech knitwear infrastructure
- Legally secured – all scalable pathways for self-adjusting, tailored apparel fall within the protected scope
- This is not an optimisation of tailoring – it is a structural re-foundation that enables the apparel industry to finally deliver scalable precision, predictable outcomes, and sustainable operations – all from a single, legally protected system.

## 16. Competitive Moat and Legal Lock-In

*Exclusive, Mechanically Governed System Beyond Software or Sensors*

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**The invention creates an impenetrable competitive moat** – not through secrecy or software, but through **Structural Logic** embedded directly into the garment itself. Unlike contemporary technologies that rely on AI, sensors, or digital personalisation tools, this system is rooted in mechanical principles that govern how garments behave under body movement, physical force, and structural tension.

The method achieves self-adjusting, structurally tailored garments through **mechanically based inter-panel logic** and **targeted reinforcement**. While the patent is filed within the domain of programmable knitwear, the invention is not defined by programming logic – it is governed by the mechanical configuration embedded within the garment's structural arrangement.

**Programmable knitting technologies**, such as 2-bed or 4-bed systems, provide the most efficient means of executing the method at mass-market scale, but they are not part of the invention. The method delivers programmable outcomes – not through digital code, but through engineered structure.

**The method is:**

- **Not limited to a specific machine**
- **Not defined by programming logic**
- **Not reliant on digital control systems to achieve mechanical functionality – but reliant on digital execution for scalable, repeatable production**

**As long as the shaping required by the method can be reproduced** – even through simple, repeatable programming instructions – **it qualifies as an application of the patented system.**

**This has two strategic effects:**

### 1. Legal Assurance

The invention captures all viable mechanical pathways to real-time garment self-adjustment – across machines, materials, and production setups. This ensures that partners operate with full clarity and confidence, knowing the core method is already secured.

### 2. Market Exclusivity

The outcome enabled by this method cannot be technically replicated without infringing the patent. Any attempt to reproduce its functional behaviour – regardless of the tools or terminology used – would fall within the protected scope of the patent.

## 17. Practical Extensions: Structural Support Beyond Aesthetics

*Example of Non-Medical Supportive Garments Enabled by Embedded, Mechanically Programmed Structure Beyond FIT – What Else Can the System Deliver?*

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The **CORRMETH™ method** is not limited to apparel or FIT correction only. Its engineered logic opens new territory for supportive apparel – garments that subtly stabilise, assist, or guide the body without crossing into medical device classification\*.

**This creates space for non-medical, structurally intelligent garments that:**

- Provide posture alignment through mechanically reinforced zones
- Deliver targeted shaping to accommodate asymmetries (e.g. mild scoliosis)
- Assist with movement recovery and muscular fatigue post-activity
- Stabilise specific body regions through pre-set deformation and inter-panel logic
- Support subclinical conditions discreetly – with no external appearance of “aid”

These features are not achieved through stretch, padding, or embedded electronics. They emerge from structurally encoded deformation paths – pre-programmed during garment construction and responsive to real-time body mechanics.

**Structurally Compliant – No Medical Classification Required**

The garments are:

- Fully manufacturable on existing programmable knitwear systems
- Delivered through mechanical structure – not claiming diagnosis or treatment
- Designed to enhance comfort and stability – without medical oversight

**Opens New Consumer Categories**

The patented method creates the foundation for a new class of garments:

- Supportive-wear for wellness, posture, and body awareness
- Posture-assist fashion for office, travel, and recovery
- Inclusive tailoring for people with subtle structural differences
- Discreet reinforcement for non-standard anatomy, without stigma

**This is support through structure – enabling stability, comfort, and confidence, all without appearing medical or requiring clinical pathways.**

*\* In supportive-wear applications requiring enhanced structural reinforcement or stabilisation, additional yarn types or filaments may be incorporated during the programmed production process. This does not alter the protected Structural FIT Logic, but extends its application to provide targeted support. In such cases, the garment may not be produced from a single yarn type, while still fully operating within the programmable, mechanically governed framework established by the invention.*

## 18. Market-Specific Adaptation Through Structural Complexity

### *Modular Structural Performance Across Market Tiers*

The CORRMETH™ system provides a flexible structural framework, allowing manufacturers to adjust construction complexity and performance based on market needs – all within the protected principles of the invention. **Regardless of market tier, the Structural FIT Logic remains legally and mechanically secured.**

#### **A. Base-Level Constructions – Optimised for Mass-Market Efficiency**

- Balanced for scalable production and material efficiency
- Structural FIT Logic embedded with minimal angular complexity
- Delivers self-adjusting FIT, structural stability, and tailored shaping at reduced production time
- Pre-programmed for consistent, repeatable output across large production volumes

#### **B. Enhanced Constructions – Ultra-Luxury & Performance Markets**

- Increased angular panel complexity for advanced shaping control
- Sophisticated bias-knit configurations enhancing garment behaviour and appearance
- Greater shaping precision and structural refinement for elevated aesthetic standards
- Higher levels of real-time adaptability, delivering wearer-specific precision during movement

#### **C. The Outcome – A Modular, Programmable System for All Market Levels**

- Structural complexity is adapted to market requirements without deviating from protected methods
- Mass-market garments achieve scalable FIT with material and production efficiency
- Luxury and performance garments deliver high-end structural precision and enhanced dynamic behaviour
- A single, legally protected system governs all adaptations – ensuring structural consistency, legal exclusivity, and tailored performance across product categories

This modular approach provides manufacturers and brands with the flexibility to address different consumer expectations – from mass-market efficiency to the structural precision demanded by luxury and technical markets – without compromising patent protection or structural performance.

## Legal Protection –

# Structural Logic, Technical Scope & Enforceability

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This section consolidates the legal and technical boundaries securing the patented system across machines, materials, domains, and production methods. **WO 2024/094577 A1** protects the only mechanically viable principle for scalable, self-adjusting, tailored garments – achieved through pre-programmed, mechanically **governed inter-panel logic and structural interdependence**.

Although it is filed under **CPC D04B1** for programmable high-tech knitwear, protection is also granted for woven systems, hybrid platforms and any present or future technology that can achieve the same outcome through structural replication.

Enforceability applies under established **Equivalence Doctrines across Europe, the United States, China**, and other key markets – locking all viable mechanical pathways to scalable, adaptive FIT, regardless of material, machine, or method.

The patent provides protection at every structural level, including logic, method, garment and system, ensuring legal exclusivity from conceptual design to mass-market production. Any attempt to replicate the system's structural behaviour through equivalent structures, materials, or production remains within the protected domain and is subject to enforcement.

The **invention does not protect a specific garment appearance or aesthetics; it protects the structural cause of adaptive shaping itself**. By **embedding controlled deformation, targeted reinforcement and dynamic inter-panel interaction directly into the garment**, the system eliminates the need for manual tailoring, elastics, sensors or fasteners.

Attempts to bypass the method, whether through technical variation, hybrid adaptation or alternative production platforms, **still fall within the protected scope, ensuring full structural and legal exclusivity**.

## 19. Legal Scope and Enforceability

*Comprehensive Structural and Legal Protection Across Materials, Domains, and Production Systems*

**The patented method is rooted in mechanical laws – structurally translated into garment engineering and made scalable through programmable knitwear technologies.**

Although the technical domain of **WO2024094577A1** is defined as **programmable high-tech knitwear CPC D04B1** (specifically weft knitting using **2-bed** or **4-bed flat-bed systems**), the protected invention secures the **mechanically viable principle of adaptive tailoring through structural interdependence**. This principle remains legally enforceable across all material types, machinery classes, and textile domains – including woven textiles, hybrid systems, and smart materials – provided the implementation aims to achieve the same functional outcome through **controlled deformation** and **mechanically based inter-panel logic**.

This invention defines a mechanical roadmap – already built, proven, and secured – with protection that is both technically comprehensive and legally enforceable.

There exists no alternative configuration within any known scalable, commercially viable structural, material, or manufacturing parameters capable of replicating the outcome without directly or indirectly relying on the patented **Structural Logic**.

**The scope of protection includes all implementations – regardless of material, platform, or domain – that replicate the patented Structural Logic, whether directly or through functionally equivalent means.**

Accordingly, the protection excludes all legally permissible workarounds, including any derivative methods, adaptations, or reconfigurations based on equivalent structural principles or outcomes.

### **The protection covers all structural levels:**

→ **Logic Level:** Any implementation that replaces post-production grading or patterning with **pre-engineered mechanical behaviour** embedded into the garment structure.

→ **Method Level:** Any process that integrates shaping, targeted reinforcement, and adaptability simultaneously within the creation of the garment, particularly via programmable means.

→ **Garment Level:** Any final product exhibiting real-time, self-adjusting FIT with a tailored shape — constructed without sensors, fasteners, or external manipulation.

→ **System Level:** Any scalable production method or industrial framework built upon the above logic and principles.

## 20. Global Legal Reach and Equivalence Framework

*Cross-Domain Enforceability and Legal Equivalence Doctrines in Europe, US, and China*

### 1. Core Technical Eligibility (*Enforced Starting Point*)

The protection of the patented method applies directly to:

- **Programmable Weft-Knit Systems**, including:
  - 2-bed flat-bed knitting machines
  - 4-bed high-tech knitting platforms (*multilayered for advanced shaping*)

### 2. Cross-Domain Protection: Enforceability Beyond Knitwear (CPC D04B)

Although **WO2024094577A1** is filed under programmable high-tech knitwear (specifically weft knitting on 2- and 4-bed systems), the protection extends far beyond the knitwear domain. The patent secures the **only known mechanically viable principle for scalable, self-adjusting tailored garments**.

This logic is a principle which is characterised by:

- **Adaptive tailoring through structural interdependence**
- **Pre-programmed, mechanically based inter-panel logic**
- **Real-time controlled directional deformation with targeted reinforcement** without post-production adjustment

This governing principle is legally enforceable under established **Equivalence Doctrines** across materials, methods, and domains, including future or hybrid systems, where the same mechanical outcomes are structurally achieved. Protection applies across knitwear, woven adaptations, hybrid systems, and theoretical convergences.

### 3. Applicable Equivalence Doctrines

Legal enforceability applies across all territories recognising functional equivalence, including:

- **Europe – EPC Article 69 + Protocol on Interpretation**
  - Protection includes functionally equivalent implementations.
- **United States – Doctrine of Equivalents**
  - Infringement applies to systems performing the same function, in the same way, to achieve the same result.
- **China – Principle of Equivalence**
  - Legal coverage extends to systems achieving the same technical effect, even if methods vary.

#### 4. Legal Protection Also Extends to:

- **Woven Systems** – if they reproduce the protected **Structural FIT Logic** through:
  - **Targeted reinforcement**
  - **Mechanically based inter-panel logic**
  - Integrated self-adjustment
- **3D Systems + High-Tech Knitwear Hybrid Systems**
  - Any present or future 3D manufacturing system structurally combined with programmable knitwear.
  - If it implements self-adjusting tailored structure via mechanical deformation and directional control.
- **Any machinery, method, or system** – present or future – that structurally achieves the **same mechanical outcomes** as those governed by the patented method
  - Including *emerging, conceptual*, or converging hybrid platforms.

Whether via **programmable knitwear, bias-reinforced woven garments, or 3D-printed hybrid structures** – any attempt to achieve scalable, dynamic FIT through internal structural behaviour is legally locked under **WO 2024/094577 A1**.

#### 5. Summary Enforcement Criterion

If a garment performs the same **structural function** – regardless of visual design, material, or production method – it falls within the scope of the patented logic.

#### 6. Reference Note

A full breakdown of applicable machinery, materials, and hybrid system coverage is detailed in the **Legal Enforcement Framework**.

#### 7. Patent Reference Summary

- **WO2024/094577 A1** – Governing patent
- **European Patent Convention (EPC)** – 2025 | EPC Art. 69 + Protocol
- **US** – 2025 | Doctrine of Equivalents
- **China** – 2025 | Principle of Equivalence

*Note:*

*Full breakdown of machinery, materials, and hybrid system coverage is provided in a separate **Legal Enforcement Framework** (available upon request or for internal licensing use only).*

## 21. Full Legal Scope and Protected Structural Outcomes

*Exclusive Protection for the Method, Structural Logic, and Mechanically Governed FIT Outcomes*

The patented invention secures the only known **structural system** capable of delivering **real-time, self-adjusting tailored FIT at scale** – without relying on manual tailoring, electronics, sensors, or fasteners. It protects both the **method** and the **Structural Logic** by which adaptive shaping and tailored garment performance are achieved through **mechanical interdependence**.

At its core, the system governs FIT through through engineered **structural behaviour**, based on:

- **Angular displacement of panels** – including **bias orientation** and any controlled deviation from the principal knit direction, unlocking a level of structural adaptability previously considered unmanageable in scalable apparel production.
- **Targeted reinforcement** – stabilising the structure while enabling targeted flexibility.
- **Dynamic interaction** between zones of tension, stability, and adaptability – delivering self-adjustment and shaping in response to movement and force.

These components work together as a unified, **pre-programmed mechanism**, embedded directly into the garment during production – not added later, not reliant on elastics, not dependent on sensors.

**The protection applies to:**

- Any garment exhibiting this **structural behaviour**
- Any production method embedding this **mechanically governed structure**
- Any system or process architected upon the same principles of adaptive, structural interdependence

Importantly, this is not a protection for a visual garment design. It protects the **mechanical cause** of adaptive shaping: the deliberate relationship between form, force distribution, and controlled deformation.

**The patented method eliminates the need for:**

- Manual post-production tailoring or shaping
- Stretch-only with elasticity-dependent garment solutions
- Smart garments relying on electronics, sensors, or external triggers
- 3D-printed or hybrid constructions attempting to replicate the same **angular panel alignment** and **targeted reinforcement**-driven behaviour

Any system that attempts to replicate the structural outcomes – including through 3D-printed or hybrid constructions using angular panel alignment and targeted reinforcement – would infringe the protected scope of the patent. **Summary: Any system delivering scalable, real-time, self-adjusting FIT through mechanically governed deformation and targeted reinforcement falls within the protected scope.** Attempts to bypass the system – whether by technical variation, hybrid adaptation, or alternative production platforms – still rely on the same **Structural Logic**, which remains exclusively protected.

## 22. Comprehensive Summary – Advanced FIT Architecture & Structural FIT Logic

*Patented Method Overview and Global Reach*

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### Strategic Market Positioning and Technological Significance

The patented invention titled **"An Automated Method for Knitting a Tailored Three-Dimensional Garment"** (WO 2024/094577 A1) delivers a groundbreaking system that enables **scalable, self-adjusting tailored FIT** through the use of embedded structural engineering in programmable knitwear.

At its core, **Advanced FIT Architecture** is a novel, protected domain that transforms the scalability of garment FIT through a systematic, mechanical approach. Central to this innovation is **Structural FIT Logic** – an integrated, legally protected framework that ensures a perfect FIT for the final mass-market customer, **eliminating the need for manual intervention or customisation**. This is achieved by embedding tailoring, shaping and **adaptive FIT** directly into the garment's structure, regardless of production scale.

This patented method represents a fundamental shift in garment engineering. It **replaces traditional pattern-based sizing and reactive tailoring with an engineered, programmable system** that incorporates self-adjustment principle of FIT into the garment's future construction. Unlike traditional grading methods, which rely on approximate flat patterns and uniform size increments that are insufficient to accommodate the population's vast morphological diversity, this method establishes **Structural Fit Logic as a mechanically precise, dynamic system that combines angular panel behaviour and targeted reinforcement to enable real-time self-adjustment**.

**By transforming FIT from an external approximation into an embedded structural property** scalable at industrial volumes, the method eliminates the systemic misalignment, inefficiencies and costly post-production alterations that are inherent in conventional apparel manufacturing. Creating a legally protected, technology-agnostic platform that delivers consistent, scalable, and precise FIT across all garment types sets a new industry standard for mass garment production. This is achieved by embedding FIT as a programmable logic system from the outset.

**This invention resolves foundational structural failures in apparel manufacturing, unlocking significant operational efficiencies and reducing inventory risks. It also establishes high barriers to entry for competitors. Positioning itself as a critical enabling technology, it boasts strong commercial defensibility and substantial growth potential across both mass-market and premium segments.**

This method is compatible with a wide range of technologies, including AI-driven design tools, hybrid material constructions and smart apparel ecosystems. It offers the only legally viable, scalable solution for delivering truly self-adjusting, tailored FIT at an industrial scale.

## Technical Innovation and Validation

Published as **WO 2024/094577 A1** (priority date: 2 November 2022), this invention is a significant breakthrough in the engineering of programmable knitwear. It is the **first system capable of achieving a perfect FIT on an industrial scale which is based on the mechanical laws that govern inter-panel correlation**. The method enables the unlimited production of perfectly fitting garments using a multitude of fibres, eliminating the need for external components or manual adjustments. During the examination of the international patent, the invention was recognised as structurally novel and independently defensible, surpassing prior art, including patents held by major industry players.

## Jurisdictional Coverage and Market Reach

The patent secures exclusive rights in key jurisdictions – **Europe (EPO)**, **United States (USPTO)**, and **China (CNIPA)** – covering approximately **2.19 billion people**, or **27%** of the global population. This protection encompasses **80–89%** of global apparel market spending, spanning design, manufacturing, and emerging **smart apparel ecosystems**.

Strategically aligned with the rise of AI-driven design and adaptive apparel technologies, the patent offers commercial exclusivity and future-proofing for licensees worldwide.

## Legal Validation and Structural Significance

International patent authorities, including the PCT and EPO, have recognised this invention as structurally novel and distinct from prior art – notably including high-profile references such as **WO2016018904A1 · NIKE Innovate C.V.** Within this competitive domain, only two patents have been formally cited by international examiners as structurally novel: • **WO2023069764A3 · NIKE Innovate C.V. · Footwear** And • **EP4365344A1 · NATALIYA DOLENKO GENÈVE SA · Scalable, self-adjusting tailored apparel. This invention stands as one of the most significant structural innovations in apparel engineering to date.**

It is the first system capable of delivering a perfect FIT at an industrial scale through mechanically governed inter-panel correlation. This enables the unlimited production of perfectly fitting garments using a broad range of fibres, eliminating the need for external components or manual adjustment.

## What the Patent Protects in Plain Terms

- The only legally recognised **Structural FIT Logic** enabling scalable, real-time self-adjustment through mechanical interdependence.
- The method by which **angular panel alignment, targeted reinforcement**, and controlled deformation deliver tailored shaping without relying on sensors, elastics, or fasteners.
- Any garment, system, or process exhibiting these structural behaviours – regardless of material, application domain, or production method.

This invention replaces fragmented, size-based apparel systems with **Advanced FIT Architecture**, which guarantees tailored precision that is structurally embedded, scalable and legally protected across mass production.

## Structural FIT Logic: Mechanical Foundation for Apparel Engineering

The invention translates fundamental mechanical principles – including **force distribution, deformation thresholds, and angular interactions** – into pre-programmed, self-adjusting garment structures. Utilising **angular panel alignment, targeted reinforcement, and controlled deformation pathways**, the system achieves:

The invention translates fundamental mechanical principles – including force distribution, deformation thresholds and angular interactions – into pre-programmed, self-adjusting garment structures. Using **angular panel alignment, targeted reinforcement and controlled deformation pathways**, the system achieves the following:

- **Real-time adaptive FIT** at mass scale
- Predictable tailored outcomes for nearly all body types
- A **2.67× SKU coverage expansion**, reducing SKU fragmentation
- Elimination of sizing misalignment and manual tailoring dependency
- Seamless integration with existing **2- and 4-bed programmable knitwear technologies**

**This method establishes scalable FIT as an engineered, pre-programmed and legally protected outcome. It does this by embedding precision tailoring through mechanical inter-panel movement directly within the garment architecture. This replaces approximation with engineered certainty.**

## Industry and Consumer Impact

For manufacturers, this method replaces fragmented size systems with a unified, programmable FIT infrastructure, reducing costs, decreasing SKU complexity and minimising returns and overproduction.

Consumers receive garments that offer **bespoke comfort** and an **adaptive FIT** without the need for costly customisation. Precise structural engineering enhances sustainability by enabling leaner supply chains, **extending garment life cycles** and facilitating **advanced recycling** through **mono-material construction**.

## Key Outcomes and Operational Advantages

- **Structural precision** is fundamental, enabling scalability without compromising FIT integrity
- **Programmable instructions** deliver consistent and accurate production across all manufacturing platforms and facilities.
- **Each engineered size can accommodate virtually all body types**, including those that fall between traditional sizes, achieving FIT adaptability without the need for customisation.
- The system replaces traditional size approximations with structurally defined, **dynamic FIT logic**.
- Three engineered sizes comprehensively cover the equivalent of eight conventional SKU, simplifying **inventory management** and **reducing waste**.

- **Tailoring is integrated directly into the garment's construction**, eliminating the need for seams, darts, fasteners or post-production alterations.
- Garments adapt seamlessly to the **wearer's movements** and body changes in **real time**, providing personalisation without the need for adjustments or custom-made garments.
- This unified, repeatable system **ensures aesthetic precision** and **manufacturing efficiency** at any scale.
- All production processes are aligned to actual consumer demand, minimising overproduction and optimising supply chain performance.

**This system transforms FIT from a reactive outcome into a pre-programmed structural behaviour – repeatable at scale.** It replaces fragmented assumptions with structural certainty, enabling tailored FIT across a wide range of morphological shapes, eliminating the need for fasteners or external aids. By expanding size coverage from one to up to four conventional sizes, it:

- Reduces unsold inventory by up to 78.6%
- Converts a 50/50 sales ratio into a predictable, high-precision model
- Expands market coverage by a factor of 2.67.

**Rather than attempting to fit 243 distinct FIT Cases into a single static size, garments adapt in real time, broadening market coverage without increasing SKU.**

#### **Key distinction:**

This is not a tool for bespoke customisation or personalisation that requires individual input or adjustments. Instead, it is a scalable, mass-production-ready system that replaces traditional customisation methods by embedding adaptive FIT technology directly into the structure of the garment, providing a perfectly tailored experience on a large scale.

## **Market Exclusivity and Legal Boundaries**

This invention establishes an exclusive chain of execution that cannot be circumvented by incremental changes or iterations. Its protection comprehensively covers:

- **Structural Geometry:** Engineered panel configurations and spatial relationships that are critical for adaptive FIT
- **Mechanical Law:** Physical principles of deformation, force distribution, and reinforcement
- **Apparel Engineering:** Integration of these principles into scalable garment architecture
- **Programmed to Scale:** Translation of engineered structures into programmable manufacturing at industrial volumes

#### **No Viable Alternatives:**

- **Woven Tailoring** offers precision but lacks scalability, relies on manual labour. It is also unable to provide real-time adaptive FIT. Its rigid, manual processes make industrial-scale self-adjustment unfeasible.

- **3D Printing** and **Hybrid Systems** currently produce inflexible garments that lack key textile properties such as elasticity and dynamic deformation. Even hybrids with knit components remain within the scope of this patent when adaptive behaviour is driven by knitting.

## Patent Domain and Structural Barriers

The patent protects the only known system that combines **angular panel alignment** with **targeted reinforcement** in order to deliver controlled deformation and a real-time, **self-adjusting FIT**, all without the need for external aids. This protection applies to knitwear of all types, materials and production methods – and beyond.

### Competitor barriers include:

- New manufacturing technology and infrastructure development, requiring an estimated **€40–60 billion** over **15–20 years** (*information is available upon request and subject to NDA*)
- No guaranteed legal clearance for any system replicating the protected **Structural Logic**
- Defensive company disclosures\* and alignment with advanced **CPC classifications**, further safeguarding the patent from derivative innovations

## Cross-Domain Enforceability

The international patent laws of **Europe**, the **United States** and **China** enforce functional equivalence – meaning that any system that replicates this adaptive shaping and **Structural FIT Logic**, regardless of the material used or the production method employed, constitutes an infringement.

### Condensed Conclusion – Structural Blueprint Secured

This invention delivers the only legally protected, structurally viable system for scalable, self-adjusting tailored apparel. It replaces reactive, size-dependent production with an engineered framework governed by:

→ **Structural Geometry** → **Mechanical Law** → **Apparel Engineering** → **Programmable Manufacturing**

There are no known mechanical, legal, or commercially viable alternatives outside this protected structure. Attempts to replicate real-time, self-adjusting FIT – whether through woven, hybrid, or emerging technologies – fall within the patent's enforceable scope.

Industry estimates project that replicating this structural capability would require €40–60 billion in new technology development, infrastructure, and market re-education – with no guaranteed legal clearance.

**The result:** A future-proof, globally deployable system that establishes *Advanced FIT Architecture* as the apparel industry's structural foundation for scalable precision and legal certainty.

# TECH DEEP DIVE

## STRUCTURAL LOGIC FOR RESPONSIVE APPAREL

*This Section Assumes an Intermediate Level of Technical or Engineering Literacy*

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**The Tech Deep Dive reveals the patented system's most defining achievement: overcoming the core structural cause of unsold garments – size misalignment.** This section outlines the fundamentals, explored in detail in *Document 2*.

Chapter 26 demonstrates that misalignment, inefficiency, and unpredictability in apparel were never isolated flaws – they were the inevitable consequence of missing structural logic.

The patented method is not an optimisation of tailoring or knitwear. It is a structurally novel system that unifies both domains – eliminating the long-standing limitations that have prevented scalable, high-precision apparel production.

By introducing **Structural FIT Logic**, the method overcomes the limitations of static constructions, turning FIT into a dynamic, engineered property governed by the interplay of geometry, mechanical law, and scalable programming. It replaces outdated, reactive practices with a unified, self-adjusting framework that governs garment behaviour from fibre to finished product – eliminating inefficiencies at their source.

This is not a technical workaround. It redefines apparel as an engineered discipline, where precision, adaptability, and scalability are embedded by design – not achieved by exception.

**The system transforms instability into engineered predictability, structural chaos into control, and fragmented processes into a single, legally protected, scalable logic.**

## 23. PREFACE – Structural Logic for Scalable Apparel Engineering

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While advanced programmable knitting technologies – including CAM/CAD systems – have been commercially available since the 1980s, their application has been predominantly directed towards aesthetic effects, and shaping based on two-dimensional tailoring logic.

The same structural logic that governs architecture, engineering, and software applies universally – yet within programmable knitwear, the **Structural FIT Logic** required to achieve scalable, self-adjusting, tailored garments had never been systematically defined or applied.

➔ **The patented invention establishes the structural foundation.** The same principles long applied in other technical fields have been translated into apparel:

- The missing structural layer – **Structural FIT Logic** – has been embedded within, applicable to any garment architecture.
- **Mechanical Logic** has been integrated directly into programmable knitwear systems, leveraging both the micro-engineering potential of the technology and the systemic predictability of digital programmability.
- With a pre-programmed structural framework, shaping, aesthetics, comfort, and performance follow predictably and consistently.

This advancement is not defined by new machines or materials. What was missing was a structural system – the engineered relationship between **angular panel behaviour**, **targeted reinforcement**, and **mechanically based inter-panel logic** – capable of being applied to any tailoring form to achieve structured, responsive behaviour.

### The patented method:

- Introduces a unified, repeatable, scalable **Structural FIT Logic** framework – providing clear, application-specific guidelines for apparel construction.
- Merges **Mechanical Logic**, programmable knitwear capabilities, and digital predictability into a single, controllable system.

### ➔ Outcome:

A digitally programmable, self-adaptive **Structural FIT Logic** applicable across all forms of construction – functioning through dynamic self-adjustment in real time.

### In descriptive terms:

*“The patented system functions as the first digitally programmable, self-adaptive **structural ‘mannequin’** – capable of prototyping dynamic, form-fitting structures in real life, at scale, across domains, and engineered to accommodate the full spectrum of anatomical configurations through structural self-adjustment.”*

**This development represents the convergence of:**

- The anatomical, Structural Logic of garment shaping
- The micro-engineering potential of programmable knitwear
- The systemic predictability of digital programmability

It is the structural system – not the existence of programmable software or hardware – that defines this breakthrough, enabling the complete replacement of manual tailoring processes at scale. Once that system is defined, protected, and embedded into programmable logic, scalable, self-adjusting tailored apparel becomes viable in any form.

This logic applies universally – across apparel, body types, product categories, volumes, and beyond – wherever structural logic governs the construction.

# Patented Invention WO/2024/094577 A1 Abstract

## Title

(EN) AN AUTOMATED METHOD FOR KNITTING A TAILORED THREE-DIMENSIONAL GARMENT, AND A KNIT GARMENT

(FR) PROCÉDÉ AUTOMATISÉ DE TRICOTAGE D'UN VÊTEMENT TRIDIMENSIONNEL PERSONNALISÉ, ET VÊTEMENT TRICOTÉ

## "Abstract

(EN) The present invention provides for an automated process for producing knit garments having a tailored look when worn by wearers having different body shapes. Through a combination of woven fibre tailoring techniques, adapted to the domain of knit fabrics, and an innovative approach to programming a three-dimensional seamless garment knitting machine to knit the garment in a new way, a knit garment can be produced which adapts to fit different wearers having different body types while following the wearer's anatomy and providing support where required, thus allowing the same garment to provide a tailored look to different wearers having different body shapes.

(FR) La présente invention concerne un procédé automatisé de production de vêtements tricotés ayant un aspect personnalisé lorsqu'ils sont portés par des porteurs ayant différentes silhouettes. Par l'intermédiaire d'une combinaison de techniques de personnalisation de fibres tissées, adaptées au domaine des tissus tricotés, et d'une approche innovante pour programmer une machine de tricotage de vêtements sans couture tridimensionnels pour tricoter le vêtement d'une nouvelle manière, un vêtement tricoté peut être produit pour s'adapter à différents porteurs ayant différents types de silhouette tout en suivant l'anatomie du porteur et fournir un support le cas échéant, permettant ainsi au même vêtement de fournir un aspect personnalisé à différents porteurs ayant différentes silhouettes. "

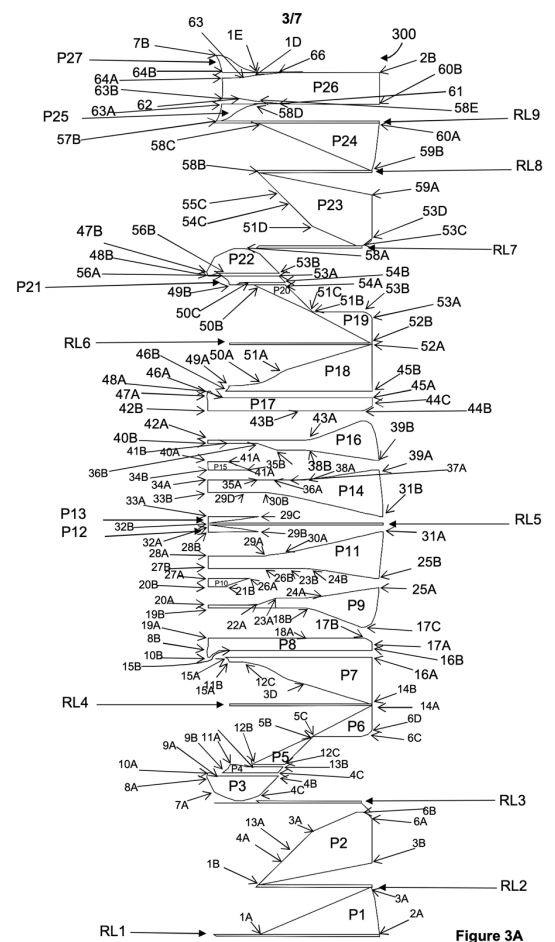


Figure 3A

Publication Number: WO/2024/094577

Publication Date: 10 May 2024

International Application No: PCT/EP2023/080128

International Filing Date: 27 October 2023

Priority Date: 2 November 2022

Applicants: NATALIYA DOLENKO GENEVE SA [CH]/[CH]

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<https://patentscope.wipo.int/search/en/detail.jsf?docId=WO2024094577>

Priority Data:

Publication Number: EP4365344 A1

Publication Date: 8 May 2024

Application No: EP22205011.4A

Filing Date: 2 November 2022

Applicants: NATALIYA DOLENKO GENEVE SA [CH]/[CH]

Inventors: Nataliya Dolenko

<https://patents.google.com/patent/EP4365344A1/en>

## 24. Why Knitwear – From Structural Instability to Scalable Tailored Precision

The very instability that once made knitwear unsuitable for tailoring became the foundation of a new Structural Logic – enabling garments to self-adjust with precision no woven method could match.

### Why Knitwear – Not Woven – Enabled the Breakthrough

**Woven garments** produced with cut-and-sew techniques have long defined tailoring standards – but they rely on fixed patterns, seams, and cuts, which inherently limit their ability to adapt dynamically to the body. As a result, innovation in woven tailoring remains concentrated on fabric types, fastening methods, or finishing techniques – not the structural behaviour of the garment itself. This is why there are virtually no patents in the woven sector addressing construction logic or adaptive movement without external mechanisms: the woven structure is static by definition.

**High-tech programmable knitwear**, by contrast, offers significantly greater structural flexibility for innovation. It enables control not only over stitch behaviour and tension, but over multiple stages of garment creation within a single programmable process:

- **Fabric is engineered from scratch** – through controlled stitch formation, tension, and yarn behaviour
- **Shaping is embedded directly** – replacing traditional pattern-cutting used in woven construction
- **Garment is constructed seamlessly** – eliminating post-process sewing entirely

This inherent integration enables significantly broader opportunities for structural innovation compared to woven methods, where fabric production, shaping, and assembly remain fragmented, labour-intensive processes. As a result, programmable knitwear has become a recognised domain for patent activity. However, the majority of prior art has been focused on localised functionality – such as zonal compression, support structures, or performance-enhancing areas, particularly in footwear. These developments did not redefine the overall structural behaviour of the garment, nor did they attempt to replicate or replace the principles of tailored construction.

Tailored garments based on woven construction principles do not adapt, as the structure is inherently static. Adaptive garments within prior art in knitwear did not provide tailoring – unless produced as custom-made items based on 3D body scanning, involving multiple personalised stages, and at significant cost.

## 25. Establishing an Advanced FIT Architecture – Through Universally Applicable Principles of Engineering

*The New Discipline Introduced: Advanced FIT Architecture Across Mass-Market Production*

*“It is a new use of knitwear in the market in general... Products, which can be developed along different categories... I am convinced... beautiful sellable products..”*

*– The Developer and Owner of the Leading Luxury Store Chain*

### What Does “Self-Adjusting FIT” Actually Mean

It is often assumed that “*FIT*” implies fixed structure – as in traditional tailoring – while “*self-adjusting*” implies flexible, unstructured change. As if the two must contradict.

This invention **unifies** both within a controlled, programmable structure:

- **FIT** = Tailored precision – structure that shapes and aligns shapes and aligns precisely with the body
- **Self-adjustment** = Engineered structural response – delivering adaptability in real time through built-in mechanical logic

### The Breakthrough

**Dynamic Tailoring that adapts – dynamically, continuously – without fasteners, elastics, or body scans**

- A garment that **remains tailored** while adjusting seamlessly to the wearer in motion.

This is not a contradiction – it is the **functional resolution** of a historical limitation in the logic of garment construction.

### Redefining FIT and Adaptability

Historically:

- **FIT** meant static shaping – a rigid construction standard that all bodies were expected to *conform to*.
- **Adaptability** meant imprecision – shapelessness or stretch designed to accommodate variation, but lacking structural control.

**This invention merges both:**

- **FIT** becomes structurally programmable at mass scale
- **Adaptability** becomes an engineered structural response – precise, real-time, and embedded into the garment architecture.

**Outcome:** A tailored structure that self-adjusts in motion – retaining its form while adapting to the wearer.

The invention defines the way forward – enabling the industry to move with confidence:

- **It redefines how FIT is achieved, maintained, and scaled – not through compounded approximations segmented by fixed intervals, but through structural precision engineered to adapt dynamically in motion.**

### **The Meaning of Self-Adjusting FIT**

To understand the shift, two misconceptions must be reset:

- **Tailoring ≠ rigidity**
- **Adaptability ≠ shapelessness**

This invention unites both – redefining them as structural functions.

### **Advanced FIT Architecture**

This is not an enhancement of tailoring, nor a progression of activewear.

- Not tailoring
- Not elasticated wearable
- Not stretch-based wearables

It introduces a new domain where the responsive structural logic is embedded directly into apparel form.

A new **Structural Logic** → **Responsive Dynamic FIT** embedded directly into any garment's construction.

**Reliably.**

**Precisely.**

**At scale.**

## Dynamic Construction vs. Retrospective Tailoring\*

Unlike retrospective tailoring – which imposes a fixed structure preset by two-dimensional paper modelling techniques and defined by industry size ranges to fit anatomically diverse individuals – this invention redefines how garments behave:

- **Structure becomes responsive. FIT becomes dynamic.**

Rather than cutting static shapes to approximate the body, this method constructs pre-engineered logic that adapts in motion – structurally, predictably, and without post-production adjustment.

### This approach:

- Reshapes the meaning of pattern-making
- Eliminates fixed assumptions
- Enables garments to **actively respond** – not just contain.

### *\*What retrospective (rigid) tailoring means:*

- *A fixed definition of FIT – pre-established by patternmakers using paper-based templates, each size built on a predetermined set of body parameters*
- *Applied uniformly – regardless of individual structural differences*
- *With no dynamic behaviour: garment either fits, or it does not.*

## 26. From Pattern-Based Assumptions to the Precision of Engineered FIT

*How Legacy Systems Embed Misalignment – and Why a Structural Shift Was Necessary*

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### 26.1 | Static Pattern Logic vs. Structural FIT

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For over a century, the apparel industry has relied on a grading-based paradigm: drafting flat patterns from averaged anatomical data, grading these into fixed size increments, and applying them uniformly across diverse populations. While this model facilitates mass production, it fails to address structural FIT.

In such paper-based system, FIT is not embedded into the garment's construction – it is estimated through averaging population data via approximated pattern alignment. The result is a disconnection between the wearer's real structure and the internal logic of the garment.

### 26.2 | Standardised Sizing: A Compounded Approximation

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Size labels such as 36, 38, 40 are not fixed anatomical references. Instead, each size represents a tolerance zone: a range typically spanning  $\pm 2$  cm across **five core body parameters** – **bust, waist, hips, torso length, and chest width**. These five parameters define the structural integrity of any fitted garment.

If each parameter is allowed three positions within that range (lower, average, upper), then a single size label technically covers  $3^5 = 243$  **structurally distinct body profiles** – of which **only one** matches the pattern it was designed for.

Thus, **only 0.41%** of individuals classified under a given size align fully with the intended structural configuration. The remaining **99.59%** result in **varying degrees of mis-FIT** – before even accounting for broader morphological diversity.

### 26.3 | Grading Assumptions vs. Anatomical Reality

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Grading systems apply uniform increments across all body parameters, presuming proportional scaling. In practice, this assumption fails. Individuals with identical bust circumferences may differ substantially in torso length or chest width, resulting in divergent fit requirements.

Compounded across parameters, this structural misalignment becomes systemic. Attempts to compensate with micro-adjustments (e.g., 0.5 cm pattern refinements) are rendered ineffective when body deviations regularly **exceed 5 – 7 cm**. Mis-FIT is not a margin of error – it is the predictable outcome of a flawed framework.

## 26.4 | Consequences: Misalignment Scaled as Systemic Inefficiency

This structural mismatch propagates inefficiency throughout the supply chain:

- **Conversion loss:** Garments tried but not purchased due to mis-FIT
- **Returns & bracketing:** Consumers purchase multiple sizes and return the majority
- **Distorted demand signals:** Data misrepresents actual size requirements
- **Inventory waste:** Incorrect size distribution leads to unsold inventory and markdowns
- **SKU proliferation:** Expanded size ranges fail to resolve core mis-FIT
- **Operational drag:** Every misaligned garment adds cost without delivering value

Data and AI models trained on return behaviour or sales history cannot correct a pattern that was never structurally functional for the population it serves.

## 26.5 | Systemic Oversight: No Structural Modelling Exists

To date, no industry-wide model has quantified the **243 structural variations Cases within a single size label**. Nor has the failure rate – **99.59%** – been acknowledged in published size grading methodologies. Anatomical parameters are treated in isolation, without mapping their interplay. As a result, garments are developed under the assumption that FIT can be achieved through independent parameter matching, when in reality, their interdependence is the cause of systemic failure.

## 26.6 | Summary: Pattern-Based FIT Cannot Deliver Structural Accuracy

The legacy sizing system embeds the following structural errors:

- **Assumption of fixed proportionality** in body dimensions across populations
- **One-size grading logic applied to 243 distinct types of configurations** within each size
- **Over Reliance on statistical inference**, without structural modelling
- **Failure to integrate multi-parameter interdependence** within garment logic

These errors are not correctable through AI, data augmentation, or size expansion. They are foundational flaws – replicated, scaled, and absorbed by the entire system.

## 26.7 | Rationale for Reinvention

No incremental modification can resolve what is structurally incompatible by design. To achieve precision FIT across diverse bodies at scale, a new approach must:

- **Embed FIT within the construction itself**, not as an external overlay
- **Acknowledge interdependent structural parameters**, not isolated metrics
- **Transition from approximation to mechanical alignment logic**

**This is the foundation upon which the patented method is built.** It replaces pattern-based assumption with **engineered structural certainty**, introducing FIT as a programmable logic system – capable of accommodating morphological diversity **without misalignment**.

## 27. Apparel Disruption: Structural FIT Logic as an Engine of Efficiency

*Structural FIT as a Mechanical System – From Method to Industry Execution:*

- *This method introduces a fundamental improvement that makes any garment FIT predictable, scalable, and precise — delivering benefits traditional methods cannot match.*

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### Applied FIT Logic – From Estimation to Engineering

This chapter outlines the complete transformation made possible by the patented method – shifting from outdated, assumption-driven pattern grading to a scalable, embedded system of **Structural FIT Logic**. It demonstrates how the principle of structural FIT can be used to create a universal, programmable and legally protected framework for industrial replication, thereby changing the theory and practice of how garments are engineered, produced and scaled.

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#### 27.1 | Structural Truth vs. Estimation

The apparel industry has long relied on estimation, such as drafting flat patterns based on averaged anatomical data and grading them into incremental sizes (36, 38, 40, and so on). These patterns are then applied to the population as a whole. However, this process is not anatomically accurate. It is a statistical compromise that creates only the illusion of precision.

Each size allows for a tolerance of  $\pm 2$  cm across **Five Key Structural Parameters\***: bust, waist, hips, torso length and chest width. This generates **243 distinct structural variations per size**, only one of which aligns with the intended pattern. In effect, **99.59%** of people assigned to a given size do not structurally FIT it as designed.

These misalignments are not marginal errors, but rather **built-in failures of a system that compresses anatomical complexity into simplified numerical codes**. Consequently, **mis-FIT** is not the exception – **it is the rule**.

- Poor conversion rates
- High returns and bracketing
- Distorted demand signals
- Inventory waste
- SKU overload
- Operational inefficiency

Each of these issues is a direct outcome of structural misalignment – a problem that cannot be solved through size expansion, AI optimisation or cosmetic redesign.

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*Document 2 extensively covers the Five Key Structural Parameters that cause static size FIT misalignment.*

## 27.2 | Static Pattern Grading Cannot Engineer FIT

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Pattern grading on paper assumes proportional scaling at equal intervals between sizes, meaning that increases in bust circumference, for example, are accompanied by a predictable increase in hip or torso length. In practice, however, this does not correspond to reality.

➔ **The key factor is human proportional variation. Parameters do not decrease or increase linearly.**

Grading systems treat each measurement independently, but garments function as **interdependent 3D structures**. Even **minor deviations** (e.g. in torso rotation or shoulder slope) can result in visible **distortion or poor drape**. Attempts to correct this through micro-grading (e.g. refining by 0.5 cm) are ineffective when deviations of 5 – 7 cm are common.

**The consequence is that systemic misalignment is baked into every layer of development, from sizing charts to inventory planning and forecasting.** Artificial intelligence cannot resolve a structural system that was never logically constructed in the first place.

## 27.3 | Reinvention Through Structural FIT Logic

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To resolve structural incompatibility, a new system must do more than improve FIT; it **must redefine how FIT is achieved**. The patented method introduces a complete system of **mechanical interdependence, in which the FIT is built into the logic of the garment**, rather than being applied from the outside.

The core Structural FIT Logic shifts are:

- ➔
- From **static size codes** → to **Structural FIT logic**
  - From **pattern-based assumptions** → to **mechanical precision**
  - From **2D drafting** → to **3D programmable panel interaction**
  - From **post-production tailoring** → to **pre-encoded adaptation**

These changes transform the FIT process, turning it from a reactive correction into a **predefined mechanical outcome** embedded before any aesthetic or design decisions are made.

## 27.4 | Structural FIT Logic: Interdependence of Controlled Deformation and Targeted Reinforcement

The method introduces two integrated mechanical forces:

- **Controlled Deformation**

**Angular panels** enable garments to deform dynamically in response to the wearer. Unlike uncontrolled stretch, this deformation is **precise, directional, and scalable**.

- **Targeted Reinforcement**

**Reinforcement zones** prevent deformation from destabilising the structure. By anchoring motion at critical points, tailored shaping is preserved, even during dynamic movement or prolonged wear.

Together, these principles form a **Universal Mechanical Framework** – programmable, repeatable, and adaptable to any garment type.

*"Embodiments of the present invention therefore feature the inclusion of elongate reinforcement structures of knit fabric at places on the garment where extra support is required."*

(WO2024094577A1)

This is **not aesthetic styling**, but **systematic, structural thinking** – determining how a garment behaves, not just how it appears.

**It replaces:**

- **Conventional pattern making and paper-based grading across rigid size increments** → with internal structural logic that governs how shaping is constructed, distributed, and stabilised – including **structural recalibration** across targeted zones.
- **Reliance on elastic yarns and external stretch to compensate for mis-FIT** → with embedded, panel-based deformation using mechanical correlation between form and function.
- **Fasteners or manual tailoring interventions** → with **built-in adaptability** requiring no external mechanisms.
- **Post-production adjustments and corrections** → with **real-time structural responses** encoded directly within the garment architecture.

This is not an improvement on existing methods.

It is a **Systemic Redirection** → a shift towards making mechanical movement an inherent property of the garment itself.

A cornerstone of the patent's scope, but not limited to, is the protection of:

- the combined logic of angular panel alignment at any angle differing from the main direction of a particular knit structure (providing full 360° coverage for a comprehensive range of movement and adjustability) – and reinforcement-based stabilisation, encompassing all configurations that trigger mechanical self-adjustment through inter-panel correlation. This includes, but is not limited to, any panel arrangement and reinforcement structure that achieves engineered dynamic shaping and tailored FIT, regardless of panel shape, position, or knitting pattern.

**Together, angular panel behaviour and targeted reinforcement form an integrated system that enables adaptive shaping and real-time FIT without relying on external mechanisms.** This dynamic, mechanical architecture replaces static pattern grading, delivering precise, scalable FIT and setting a new benchmark for knitwear tailoring.

By establishing the term *“bias knit”* as a legally specified structural logic encompassing any angle deviating from the main direction of the knit – covering the full 360° range – **this invention codifies both terminology and structural standards, positioning Structural FIT Logic as a transformative advancement in apparel engineering.**

Not only does the system address known knitwear instabilities, it also **provides the only replicable and industrially scalable framework for responsive FIT at scale.** It overcomes a long-standing structural challenge, enabling the production of perfectly fitting garments at industrial volumes with consistent precision.

## 27.5 | Engineering Perfect FIT to Scale Structure Guide

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→ From Principle to Method

→ From Method to Garment Engineering

→ From Garment Engineering to Programming

The transformation from logic to execution occurs in three stages:

### Stage 1 – Structural Definition

- Determines the FIT range and inter-panel interaction logic
- Defines angular zones and directional behaviour
- Establishes reinforcement thresholds

### Stage 2 – Garment Engineering

- Constructs panel system with built-in self-adjustment
- Configures zone behaviour by location, angle, and elasticity
- Maps targeted reinforcement to preserve silhouette

### Stage 3 – Programming for Execution

- Translates structure into machine code
- Platform-agnostic and production-ready
- Executes consistently across all programmable knitwear systems

This system functions across all programmable platforms,  
**enabling the logic to be executed with zero deviation on an industrial scale.**

## 27.6 | Three-Size Model for Eight-Size Coverage

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By leveraging embedded adaptability, each garment engineered under the method covers four conventional sizes. With only **three sizes engineered**, a full range of eight conventional sizes is covered. For example:

- A base engineered between sizes **38–40 IT** accommodates:
  - **36 IT** – slightly looser, but structurally sound
  - **38–40 IT** – ideal result, perfectly tailored
  - **42 IT** – slightly closer, but reinforced and precise

**This consolidates SKU volume, reduces inventory risk and allows for mass production with minimal variation.**

## 27.7 | Embedded Tailoring: Adaptable FIT at Industrial Scale

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**The system eliminates the traditional compromise between precision and scalability:**

- No post-production tailoring
- No reliance on elastics or manual correction
- Inefficiently precise paper-based grading is not necessary

Each garment operates as an adaptive FIT system, maintaining precise structural alignment through continuous real-time adjustment to the wearer's movements and body changes.

*"Bias knit panels allow for full advantage of the superior elasticity properties of knit fabric to be exploited... providing for flowing lines in a garment design to be realised."*

(WO2024094577A1)

## 27.8 | A Legally Protected System with No Viable Alternatives

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All mechanically viable pathways, which are governed by the natural laws of:

- **Physics**
- **Geometry**
  - **Are structurally integrated within the patented method.**

No alternative configuration can produce the same result that enables adaptive shaping and real-time FIT without relying on external mechanisms, and that:

- Embeds tailored shaping and self-adjustment together
- Functions at scale using programmable manufacturing
- Does not rely on external FIT correction (elastics, fasteners, sensors)

It is not a product → **it is a protected mechanical architecture for FIT.**

### Summary

FIT is now a **Structural Logic** programmed to scale.

The method does not improve sizing. It replaces it. **FIT is no longer a fixed size label.**

**FIT is:**

- **Precisely engineered dynamic property**
- **Pre-programmed to scale**
- **Structurally embedded into garment construction from the outset**
- **Mechanically responsive to wearer movement in real time.**
  - **This is HOW the missing foundation is permanently SET.**

By embedding this foundation, **the method unlocks a lasting level of:**

- **Operational efficiency**
- **Delivering predictability**
- **Scalability**
- **Precision**
  - **All previously unattainable with conventional FIT systems.**

As result, the method replaces size-dependent estimation with engineered Structural Logic – embedding FIT, stability, and adaptability as programmable, scalable properties secured by law.

# Structural Language of FIT – The Engineering System for Self-Adjusting Apparel

*Structural Principles, Engineering Logic, and Scalable Application*

*This Chapter Assumes a Intermediate to Advanced Level of Technical or Apparel Engineering Literacy*

## Chapter 28 – Structural FIT Logic

### 28.1 – Streamlined Structural System:

This section defines how the system integrates design and engineering intelligence into a unified, programmable framework. Through Tailoring Logic of Form and Engineering Logic for deformation and stability, Structural FIT Logic replaces fragmented tailoring with scalable, real-time adaptability embedded directly into garment construction.

### 28.2 – Universal Mechanical Principles: Angular Behaviour:

This section explains how angular panel configurations govern garment behaviour at both local and overall levels. Without intentional angular design, garments remain rigid and incompatible with human anatomy. The method applies engineered angular logic to deliver precise deformation and responsive shaping.

### 28.3 – Redefining Bias Principles in Knitwear:

This section details how the invention introduces controlled bias-knit construction into programmable knitwear. Legally defined angular panel configurations, reinforced with embedded elongate structures, enable predictable deformation and scalable self-adjustment – overcoming historical structural limitations.

### 28.4 – Structural Application of the Angular Principle:

This section outlines how angular configurations outside standard 0°, 90°, 180°, and 270° are structurally programmed to deliver real-time shaping, controlled stretch, and adaptive behaviour without external mechanisms. The system enables scalable, mechanically governed self-adjustment across garment types.

**28.5 – Multi-Level Angular Integration:**

This section defines how angular logic operates across isolated edges, complex panel geometry, and internal structural lines. The method secures unlimited programmable combinations of angular elements, enabling scalable shaping, real-time adaptability, and structural stability in mass production.

**28.6 – Reinforcement Lines for Structural Stability:**

This section explains how reinforcement lines are embedded within the garment architecture to stabilise angular behaviour, govern deformation, and preserve tailored shaping. Reinforcement operates as part of the Structural FIT Logic, delivering structural precision without external components.

**28.7 – Reinforcement for Load, Memory, and Balance:**

This section details how reinforcement logic actively distributes load, preserves fabric memory, and maintains inter-panel alignment in real time. The result is a scalable, pre-programmed system delivering consistent structural FIT and stability across diverse body types and wear conditions.

**28.8 – Illustrative Technical Example: Angular Control and Reinforcement:**

This section provides a technical illustration of angular panel behaviour and integrated reinforcement structures working in combination. The example demonstrates mechanically viable, pre-programmed garment construction that delivers predictable self-adjustment and tailored FIT at production scale.

**28.9 – Executive Summary: Structural FIT Logic Protection:**

This section summarises the protected structural principles, including legally defined bias-knit configurations, engineered reinforcement logic, and programmable deformation control. The invention secures real-time, self-adjusting FIT without external components, embedded directly into the garment structure.

**28.10 – Legally Protected Structural Framework for Advanced FIT Architecture:**

This section defines how the system secures the only viable mechanical pathway for scalable, self-adjusting, tailored knitwear. Through mechanical inter-panel logic, angular panel control, and pre-programmed shaping, the method delivers legally protected structural FIT, replacing conventional tailoring limitations.

## 28. Structural FIT Logic – From Theory to Scalable Practice

*Not More Complexity – a Leaner System at Every Operational Layer*

The system is built on a foundational logic that merges design and engineering intelligence into a single programmable framework.

### Structural Language of FIT

= **Design Intelligence** (*Tailoring Logic of Form*)

+

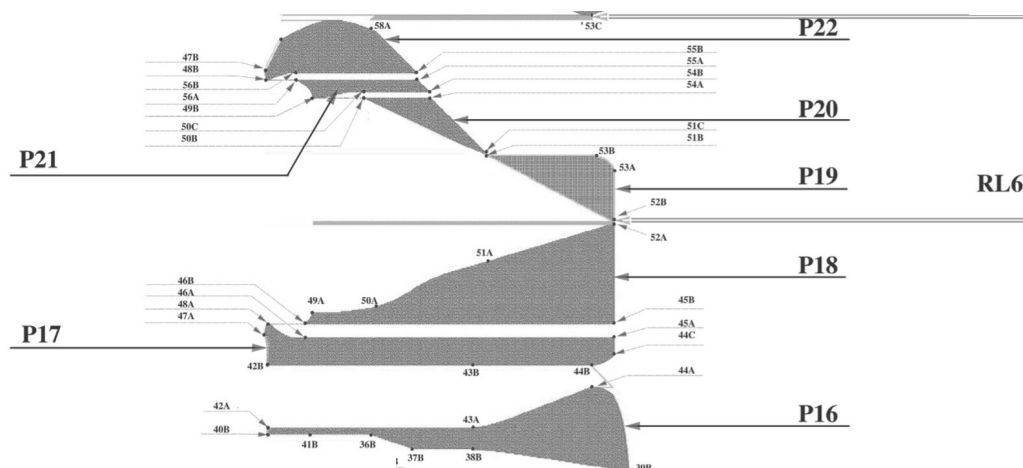
**Engineering Intelligence** (*Dynamic–Structure–Stability–Recovery Logic*)

This principle is captured in the patent description as:

*“A suite of knit fabric panels of geometrical or freeform shape having at least one edge according to a predetermined pattern design.”*

(WO2024094577)

### Structural FIT Logic demonstrational diagram intersection *Diagram 2:*



*(For illustrative purposes only — not to be used for legal interpretation)*

*“Embodiments described herein satisfy the goal of reducing the time it takes to produce a garment when compared to the “cut-and-sew” technique used for making tailored garments. The garments are designed to take full advantage of the elasticity afforded by knit fabric, while providing support where required, to allow for one garment design to fit many different body sizes and types, leading to a reduction in over-production of garments of the “wrong size” and at the same time bringing the world of couture to a larger number of people.”*

(WO2024094577)

## 28.1 | Perceived Complexity Is in Fact a Streamlined Path

*Angular — Governs Deformation, Stability, and Structural Behaviour*

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What may seem intricate at first glance is, in fact, a highly streamlined system.

**This patented method replaces fragmented sizing, rigid tailoring techniques, and visual approximations with a unified structural logic – embedded directly into the garment through programmable knitwear technologies.**

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### Defining the Structural Language of FIT

This structural language integrates two co-engineered intelligence layers:

- ➔ • **Design Intelligence: *Tailoring Logic of Form***, where shape, proportion, and silhouette are pre- composed through the intentional placement and interaction of knit panels.
- +
- ➔ • **Engineering Intelligence: *Dynamic – Structure – Stability – Recovery Logic***, where programmable deformation, panel interplay, and mechanical reinforcement govern garment behaviour under motion and wear.

Together, these form a unified, programmable framework – enabling garments to deliver tailored precision, real-time adaptability, and structural stability, at scale.

*"Garments described in the present disclosure automatically adapt to different body shapes of different wearers, closely conforming to the wearer's anatomy, without the need for buttons, zippers or other fastening devices which could otherwise interfere with the aesthetic of a garment design."*

(WO2024094577)

**Outcome: A consistent, predictable, and easily replicable solution at any production volume.**

This illustrates the patented system as a complete, co-engineered framework – where tailored form and engineering function are integrated within a single, seamless construction. Traditional tailoring logic defines the intended shape, while embedded mechanical logic enables real-time adaptability and preserves structural stability during motion and through post-wear recovery.

## Structural Representation – Visual Interpretation

### *Structural FIT Logic Demonstrational Diagram Intersection Review*

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The diagram illustrates selected structural components in their relation to the overall garment logic:

- **P17 and P18** – Pre-shaped panels defining structure and silhouette from the outset.
- **P20** – Applies advanced bias-knit logic, enabling real-time FIT adjustment without external mechanisms.
- **RL6** – A reinforcement line anchoring structural stability across zones P18 – P21, allowing the garment to adapt dynamically during wear without the need for zippers, buttons, or stretch materials.

The intersection of the diagram highlights several of the **Structural FIT Logic** key structural principles, illustrating how engineering and shaping intelligence are embedded within the garment architecture:

- **Angular Panelling (Engineering)** – Bias constructions are utilised under structural control, enabling programmable directional shaping.
- **Internal Reinforcement Architecture (Engineering)** – Tension and stability are governed within the fabric's internal logic, eliminating the need for external support.
- **Controlled Deformation Pathways (Engineering)** – Movement is engineered to be precise, directional, and fully recoverable.
- **Tailored Precision (Shaping)** – Garments maintain their intended form with visual and structural accuracy, adapting dynamically to the wearer.

## Structural FIT Logic in Motion

This system improves efficiency across every stage:

- **Design**
- **Manufacturing**
- **Wear**
- **Resale**
- **Recycling**

By eliminating fasteners, elastics, or mixed materials, it enables garments that are:

- **Fully recyclable**
- **Produced from a single yarn type**
- **Structurally self-adjusting**
- **Mass-scalable with precision**

## 28.2 | Universally Applicable Mechanical Principles of Structural FIT

### Logic: Angular Panel Configurations – Structural Possibilities Within

*Universal Mechanical Principles: Angular Behaviour*

**Angular alignment governs deformation, stability, and structural behaviour.**

In any engineered structure – from architecture to textiles – **angular configurations define how components interact**. Whether constructing a bridge or a garment, it is not only the material that determines performance – but how its elements are positioned relative to one another. In garment construction, particularly in knitwear apparel engineering, **angular configurations** directly influence how panels behave under motion. They determine how a garment shapes to the body:

- **Zonal level** – angular configurations control deformation – enabling or undermining local adaptability.
- **Garment level** – angular configurations define overall structural stability – or the lack thereof

Without intentional angular design, panels default to linear, rigid configurations. While such structures are fully controllable from a manufacturing perspective – offering predictable, fixed shaping – they provide minimal conformity to the complex geometry of the human body. The fabric does not respond to the wearer's anatomy; rather, it imposes a static structure onto a dynamic form.

This limitation is inherent in woven garments cut along the grainline (0° or 180° angle from the selvage), where rigidity locks the garment's shape in place – often restricting comfort, FIT, and natural movement. To compensate, traditional tailoring introduces darts, folds, and seams – manually sculpting the fabric to approximate a more curved structure. Despite these interventions, a fundamental structural mismatch remains: human bodies are unique, individually curved, asymmetrical, and mobile – whereas grainline-cut, linear garments enforce static, uniform shaping. This is one reason why, when executed properly, custom-made garments achieve a superior appearance – they overcome this structural misalignment by tailoring the garment precisely to individual anatomy.

One of the most well-known and structurally significant angular configurations is the **bias** – a panel positioned at **45° degrees** relative to the fabric's primary construction direction. In woven garments, particularly in womenswear and couture, bias-cut construction has long been valued for its ability to introduce fluid drape, refined shaping, and enhanced garment flexibility.

However, within knitwear manufacturing, applying bias alignment (shaping under 45 degrees angle towards the course of the knit) has historically been regarded as structurally incompatible. The combination of angular deviation and the inherent elasticity of knitted fabrics introduced uncontrolled distortion, instability, and deformation. As a result, bias-oriented construction in knits was predominantly avoided – regarded as structurally unstable and unsuitable for scalable garment production. Where applied, it served primarily as an ornamental feature for decorative draping, rather than as a controlled structural element.

## 28.3 | Universally Applicable Mechanical Principles of Structural FIT Logic: Angular Panel Configurations – Redefining the Bias Principle in Knitwear

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The present invention addresses a long-standing structural limitation in knitwear manufacturing by introducing a legally defined, controlled application of bias-oriented construction – securing it as a protected component of the patented system for self-adjusting FIT at scale.

**As explicitly defined within the patent, “*bias knit*” refers to knitted panels in which at least one selvage is positioned at an angle other than perpendicular to the direction of the knit courses.**

**The integration of these bias-knit panels into a controlled system of Structural FIT Logic enables directional deformation to be governed precisely and predictably.**

This controlled deformation is achieved through “*elongate reinforcement elements*”\*, structurally embedded between the panels themselves, and, where required, supported by additional reinforcement lines.

**Any structural configuration meeting the conditions defined within the patent – including the combination of angular panel alignment and reinforcement lines that govern self-adjustment – falls within the protected scope of the invention.**

Bias-oriented construction is no longer treated as a structural limitation but is secured as a central, legally protected element of the Structural FIT Logic.

*“A bias knit panel is a panel of knit fabric comprising courses of knit yarn, wherein at least one selvage of the panel does not line up perpendicular to the direction of the courses. The selvage follows a line which is at an angle to the direction of the courses, for example 45 degrees for a “pure bias”, or less for other types of bias. When the selvage is at 90 degrees to the course direction, this is deemed not to be a bias knit.”*

(WO2024094577)

This architectural flexibility – combining directionality, angle, reinforcement, and stretch logic – defines a new generation of programmable garment engineering: **one where form, function, and fabric logic are co-created in a single integrated process.**

The invention repositions bias-oriented construction not as a liability, but as a central, legally protected element of the **Structural FIT Logic** – securing it for the first time as a scalable, structurally governed component within programmable knitwear production.

Garments produced according to these principles maintain structural integrity and tailored shaping – even under extended use and demanding conditions.

\*\* “Elongate reinforcement elements” refers to structurally integrated reinforcement lines narrow, extended zones embedded within the knit construction

## 28.4 | Structural Application of the Angular Principle

This invention introduces the only technically and legally viable system for achieving self-adjusting, tailored FIT within a continuous, uninterrupted knit structure – without reliance on stretch materials, external fasteners, or post-production modification.

The legally defined *bias-knit* principle applies to **any automated knit construction** incorporating **geometric or freeform panels** where **at least one edge is positioned at an angle other than parallel** ( $0^\circ$ ,  $180^\circ$ ,  $360^\circ$ ) or **perpendicular** ( $90^\circ$ ,  $270^\circ$ ) to the knit direction.

- **The excluded angles:**  $0^\circ$ ,  $90^\circ$ ,  $180^\circ$ ,  $270^\circ$  and  $360^\circ$  – contribute to structural stability but do not facilitate self-adjustment.
- **All other angular deviations** – whether *subtle* or *pronounced* – are structurally integrated within a precise, programmable system, enabling:
  - **Controlled directional shaping**
  - **Controlled directional stretch**
  - **Recovery without manual intervention**
  - **Structural influence over adjacent zones**
  - **Localised adaptability for targeted shaping**
  - **Real-time, overall adaptability as an inherent, mechanically predictable property within a continuous knit structure**
  - **Overall shape maintenance in motion and structural stability – without closures, fasteners, or post-production tailoring**

These angular interactions are not arbitrary – when applied – they are predefined, programmable, and interdependent. **Their placement governs the behaviour of adjacent zones, and overall garment construction enabling garments to respond to motion, maintain structural integrity, and adapt to the body in real time – without closures or post-production tailoring.**

**The examples of Structural FIT Logic which illustrate some possible configurations** but do not limit the scope of angular panel arrangements protected under the patented system, including:

- **Between  $0^\circ$  –  $10^\circ$**  (*plus mirrored and rotational equivalents*) – provides stability and preserving silhouette
- **Between  $10^\circ$  –  $30^\circ$**  (*plus mirrored and rotational equivalents*) – introduces controlled directional stretch and local adaptability
- **Bias-Knit:  $45^\circ$**  (*plus mirrored and rotational equivalents*) – establishes high-flex regions and responsive shaping zones

Programmable angular configurations **govern movement and self-adjustment at both zone and garment level.**

**The Structural FIT Logic enables a full spectrum of programmable shape-engineering possibilities – combining dynamic FIT behaviour, structural control, and directional movement while preserving mechanical integrity and performance.**

When combined with embedded reinforcement structures, the construction governs the garment's **Structural FIT Logic** as a whole – **delivering simultaneously:**

- **Tailored shaping**
- **Structural stability**
- **Real-time self-adjustment as an inherent, mechanically predictable property**
- **Scalable production consistency**

## 28.5 | Universally Applicable Mechanical Principles of Structural FIT

### Logic: Angular Panel Configurations – Multi-Level Structural Integration

#### *Multi-Level Angular Integration*

The present invention secures the use of angular panel configurations as a fundamental component of the protected Structural FIT Logic within programmable knitwear production. As explicitly defined in the patent, a *bias-knit* is any knitted panel in which at least one selvage is positioned at an angle other than perpendicular (i.e. other than 90°) to the direction of the knit courses, whether the angle is subtle or pronounced.

The patented system incorporates angular behaviour at multiple, interdependent levels, including but not limited to:

#### 1. Isolated Angular Edges

Individual panel edges are positioned at controlled angles relative to the knitting direction to achieve specific structural effects, as outlined in the preceding chapters. These edges may be mirrored, layered or combined within the garment architecture. Their precise placement determines how individual panels deform, stabilise and interact with adjacent zones, which has a direct influence on the garment's adaptability, structural stability, and overall FIT behaviour.

#### 2. Angular Combinations Within Panel Geometry

The combination of multiple angled edges within a single panel, including triangular or polygonal configurations, creates complex yet predictable deformation pathways that enhance structural adaptability. These arrangements establish correlated angular behaviour, whereby the angles interact to provide stability, controlled shaping and localised flexibility within the panel.

#### 3. Integrated Angular Lines Influencing Panel and Structural Form

Beyond edge placement, angular geometry is integrated as structural lines within panels themselves. These angular lines contribute simultaneously to:

- **Panel-level behaviour** (*Internal panel behaviour*) – governing controlled directional deformation and targeted reinforcement
- **Overall garment shaping** – influencing structural form, stability, deformation with shape recovery and motion characteristics across the entire garment

Crucially, within this system, angular lines and panel geometry operate in structural interdependence – an engineered relationship that forms the basis of the protected method. This interdependence ensures that garments adapt structurally and dynamically to the wearer, while maintaining tailored precision and stability.

## Unlimited Combinatorial Possibilities:

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The levels of angular behaviour defined within the method are not independent categories but function as an integrated, programmable system.

**The patented method secures their interaction as an integrated system – allowing for unlimited, programmable combinations of angles, triangular formations, and angular line integration.**

**This delivers real-time adaptability, structural stability, and tailored shaping – scalable across garment types, markets, and production volumes.**

The patent secures the interaction of an unlimited, structurally governed combinations of:

- Angular panel edges
- Triangular and polygonal formations
- Integrated angular lines within panels

These programmable combinations enable real-time adaptability, structural stability, and tailored shaping – scalable across garment types, markets, and production volumes.

### 1. Single Panel Behaviour – Localised Shaping and Adaptability

- **Controlled directional shaping** – panels deform predictably along engineered angles
- **Localised adaptability** – shaping responds to wearer movement at the panel level
- **High-flex zones** – specific areas designed for enhanced flexibility without structural collapse
- **Controlled directional stretch** – deformation occurs along intentional, pre-defined pathways

### 2. Inter-Panel Influence – Adjacent Panel Interaction

- **Structural influence over adjacent zones** – individual panels affect deformation and stability of neighbouring areas
- **Real-time interaction between adjacent panels** – shaping and stability redistribute dynamically as the garment moves
- **Local shape preservation in motion** – neighbouring angles counterbalance one another, preventing uncontrolled distortion

### 3. Garment-Level Behaviour – Systemic Inter-Panel Logic and Structural Stability

- **Real-time, overall adaptability to the wearer** – the garment continuously adjusts to body movement and anatomical variation
- **Systemic inter-panel influence** – panel interactions collectively govern overall garment behaviour and structural consistency

- **Angular compensation zones and embedded structural equilibrium** – opposing panel angles neutralise deformation forces, preserving garment alignment and tailored precision
- **Full-garment structural alignment** – deliberate panel placement maintains shape and stability, even under motion or stress
- **Recovery of form without manual intervention** – garment reliably returns to engineered shape after wear or deformation
- **Structural stability without closures, fasteners, or post-production tailoring** – stability is inherent to the structure, eliminating the need for external components

## 28.6 | Structural FIT Logic: Reinforcement Lines – Shaping and Stabilising the Construction

*Reinforcement Lines for Structural Stability*

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*Internal Reinforcement Architecture (RL6 – Structural FIT Logic Demonstrational Diagram Intersection Review)*

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**The present invention establishes a structural breakthrough by integrating reinforcement and controlled deformation within a single, seamless knit construction – which may be produced entirely from one yarn type.**

**The reinforcement lines are engineered structural elements that are incorporated into the garment's architecture as an integral part of it.**

Unlike conventional stabilisers, which either constrain movement or require additional materials, these lines guide and regulate deformation, enabling the garment to adapt in real time while maintaining structural stability and tailored shaping.

*"However, bias knit panels also have the disadvantage of introducing instability in that they offer little in the way of support to the garment. Embodiments of the present invention therefore feature the inclusion of elongate reinforcement structures of knit fabric at places on the garment where extra support is required. To provide sufficient support, the yarn used for knitting elongate reinforcement structures is preferably stiffer than yarn used for knitting a panel. The yarn is preferably used in 3-ply or more to provide sufficient rigidity and support."*

(WO2024094577)

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Positioned within the garment's internal Structural FIT Logic, reinforcement elements operate in conjunction with stabilising panel configurations to convert motion into structural stability as it occurs – ensuring that each zone responds predictably and remains within controlled, pre-defined structural limits, without reliance on external fasteners, stretch materials, or post-production modification.

*"...that when knit fibre panels having those shapes and knit fibre elongate structures are combined according to the predetermined knitting instructions, they form the desired three-dimensional tailored garment. "*

(WO2024094577A1)

This enables the construction of dynamic garments in which any angular panel movement occurs within a controlled, structurally governed framework.

**Reinforcement structures anchor and regulate panel behaviour across deformation zones:**

- As the garment responds to motion (e.g. walking, bending), the reinforcement architecture stabilises panel interaction – preventing collapse, distortion, or structural misalignment.
- Garment behaviour is defined by the combined effect of angular panel movement and reinforcement structures, which operate in synchrony to maintain structural stability across interdependent zones — enabling adaptive motion while preserving tailored form.

*"Through careful design of a knit garment and its corresponding pattern design, embodiments of the present invention render it possible to create a garment which would give a tailored fit look when worn by different people having quite different body shapes."*

(WO2024094577)

**Each reinforcement line is strategically positioned to support specific angular panel displacement – or combinations thereof – based on three interrelated factors:**

- The number and arrangement of panels within the construction.
- The degree of angular deviation – panels approaching bias-knit behaviour (e.g., ~ 45°) typically require additional reinforcement to govern controlled movement.
- The surface area and placement of each panel within the overall garment structure.

**The specification of each reinforcement line is defined by:**

- **Width** – the structural area it spans within the construction
- **Tensile strength** – the degree of resistance or structural control it delivers
- **Function** – whether it facilitates, redirects, or restricts deformation within its defined zone

**Through this calibrated approach, reinforcement lines perform a dual role – delivering tailored shaping and structural stabilisation – redefined and translated into programmable garment engineering logic.** This enables the streamlined, real-time production of seamless, structurally governed knitwear at scale.

In conventional cut-and-sew tailoring, achieving structural stability and tailored form within angular zones demands complex multi-seam constructions, manual shaping, and highly skilled craftsmanship.

By contrast, the patented method – executed through advanced programmable knitwear – embeds structural reinforcement directly into the construction process. Each reinforcement element is produced automatically during knitting, eliminating manual intervention while ensuring precise, consistent structural outcomes.

**Reinforcement logic is fully pre-programmed within the garment's construction parameters – eliminating manual steps while preserving structural precision, stability, and tailored shaping.**

This system allows manufacturers to deliver garments with engineered self-adjustment and structural integrity – consistently, efficiently, and at scale – without compromising design flexibility or production speed.

**The outcome is a garment that delivers a structurally tailored FIT experience to mass-market wearers, with each pre-programmed construction replacing multiple conventional sizes and FIT variations.**

As described in the patent:

*"Another goal is to allow the possibility of a maximum number of people to wear tailored garments, providing a "couture" look to people of different body sizes and body shapes without having to use a made-to-measure method for manufacturing the garments."*

(WO2024094577)

## Practical Application Example

Each programmed construction accommodates up to four conventional sizes within a clearly defined, structurally controlled range.

As stated in the NDG Press Release (14.04.2025):

*"Each construction is engineered between two adjacent sizes (e.g., 38–40 IT) and can accommodate wearers across a defined four-size span (e.g., 36, 38, 40, and 42 IT)."*

## Technical Clarification:

The system's self-adjustment capability accommodates significant anatomical variation within each programmed construction. However, this adaptive range operates strictly within the structural parameters pre-engineered into the garment. Where a wearer's proportions exceed these structural tolerances – particularly if specific body dimensions deviate beyond the standard proportional range – optimal, structurally tailored FIT cannot be guaranteed within that construction.

## Illustrative Scenario:

For example, a wearer classified as size **42 IT** under conventional sizing, but with hip measurements approaching those typical for size **46 IT**, would exceed the structural adaptive range engineered into the Small programmed construction (designed between sizes **38 IT** and **40 IT**). In such cases, the Medium programmed construction – engineered between sizes **42 IT** and **44 IT** – would be required to deliver the intended level of structurally tailored, self-adjusting FIT.

## 28.7 | Structural FIT Logic: Technical Reinforcement. Load, Memory, and Structural Balance

### *Reinforcement for Load, Memory, and Balance*

The patented system incorporates structural reinforcement not as a restriction on movement, but as a means to precisely govern it within pre-defined, mechanically safe limits.

#### **Reinforcement logic actively governs:**

- **Load distribution** – balancing structural pressure as the body moves
- **Fabric memory** – enabling the garment to recover its engineered form after wear or stretch
- **Inter-panel balance** – maintaining alignment between angular components in real time to prevent drift or distortion

Unlike conventional garments, which often deform or lose structure over time, this **system ensures stability, adaptability, and self-adjustment without compromising structural integrity**. Even after extended wear, **panels return to their pre-set orientations**, preserving both function and silhouette.

This scalable application of structural intelligence replaces fragmented, static sizing systems with a unified, programmable – delivering **structurally tailored FIT** across diverse body types, while maintaining stability, tailored shaping, and predictable performance at scale.

Once the **Structural Logic** – including panel orientation, reinforcement placement, and deformation control – is pre-programmed, the **outcome is**:

- **Predictable**
- **Replicable**
- **Scalable**

#### **The system applies universally across:**

- Symmetrical, asymmetrical, mirrored, or layered angular configurations
- All garment types and silhouettes
- Varied shaping, movement, or support zones – without deviation in structural performance

What appears as complex shaping is, in reality, the outcome of systematically pre-engineered interactions, executed automatically through programmable knitwear technologies. Precision, adaptability, and **structurally tailored FIT** are embedded from the design stage – transforming garment engineering from an assumption-driven process into a scalable, predictable, and efficient production system.

## 28.8 | Illustrative Technical Example – Angular Control and Reinforcement

*(Technical Audience: Structural FIT Logic Demonstrational Diagram 2 Intersection Review)*

This engineered arrangement demonstrates a mechanically viable combination of angular interactions and reinforcement structures to achieve real-time, **structurally tailored FIT** – providing a scalable foundation applicable to any garment construction where self-adjustment is required, without relying on external mechanisms or post-production shaping.

The accompanying diagram illustrates a multi-panel structure (**P18 – P22**) in which angular panel interfaces, reinforcement lines, and bias-knit geometries interact within a governed, mechanically stable system:

### 1. Full-System Angular Coordination

- Points **49A** (corresponding to **49B**), **50A** (corresponding to **50B** and **50C**), and **51A** (corresponding to **51B** and **51C**), across Panels **P18**, **P19**, **P20**, and **P21**, and their mirrored counterparts (not shown), exhibit precisely controlled angular displacement when joined during production.
- The relational logic between panels is structurally programmed – managing deformation, stabilisation, and self-adjustment across the garment

### 1. Reinforcement Lines as Functional Anchors

- **RL6** and **RL7** span multiple panels, dividing high-deformation zones into stabilised sections.
- This enables controlled angular displacement – eliminating instability while preserving the garment's ability to self-adjust dynamically and maintain structural stability.

### 2. Controlled Bias-Knit Stacking

- Overlapping bias-knit geometries across multiple panels (**P18 – P22**), previously a source of structural limitation in knitwear engineering, are stabilised through the system's integrated **reinforcement logic**.
- This transforms historically unstable design zones into reliable, structurally governed self-adjustment points.

### Outcome:

The result is a scalable, pre-programmed garment structure where angular panel movement, controlled deformation, and reinforcement interact predictably – delivering real-time self-adjustment and consistent, **structurally tailored FIT** at mass-production scale.

## 28.9 | Executive Summary: Structural Language of FIT

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### Full Range of Protected Angular Configurations

The present invention secures the use of the full spectrum of angular panel configurations defined under the legally established **bias-knit principle**. These angles – whether subtle or pronounced – are structurally embedded into the garment through a precise, programmable system.

Due to the inherent rotational and reflective symmetry of knitted structures, mirrored and rotational equivalents apply consistently across the **entire 360° range** – ensuring that no structural direction remains unaccounted for within the protected framework.

### Redefining Bias-Oriented Construction in Knitwear

The patented system introduces a controlled, legally protected application of bias-oriented panel constructions within programmable knitwear – securing it as a central structural element for achieving scalable, self-adjusting, **structurally tailored FIT**.

### Definition of "*Bias Knit*" within the Invention

As explicitly defined in the published patent (WO2024094577A1), the term "*bias knit*" refers to knitted panels where at least one selvage is positioned at an angle other than perpendicular to the primary knit direction.

This structural principle enables:

- **Engineered flexibility**
- **Controlled, directional deformation**
- **Real-time adaptability**

These features allow garments to conform dynamically to the wearer's body – without reliance on elastics, external fasteners, or post-production tailoring – delivering scalable, mechanically governed adaptability fully integrated into the garment's construction.

### Legally Protected Structural Reinforcement Logic

The patented system secures engineered reinforcement structures as an integral component of **structurally tailored FIT**, governing garment behaviour from within the construction itself. Unlike conventional stabilisers – which restrict movement or rely on additional materials – these embedded reinforcement structures guide and regulate deformation, preserving both form and structural stability while enabling dynamic, real-time self-adjustment.

**Key Protected Principles:**

- **Load Distribution** – Structural pressure is balanced as the garment responds to body movement, preventing collapse or distortion.
- **Fabric Memory** – The garment reliably recovers its engineered form after wear, stretch, or repeated use.
- **Inter-Panel Balance** – Angular components remain aligned in real time, maintaining structural integrity and ensuring continuous, self-adjusting FIT.

The protection applies not only to advanced reinforcement arrangements but also to the **minimum viable Structural Logic** required to achieve tailored shaping, structural stability, and real-time self-adjustment – without dependence on cut-and-sew techniques, stretch-based compensation, or manual tailoring intervention.

## 28.10 Legally Protected Structural Framework for Advanced FIT Architecture

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This invention replaces conventional tailoring limitations with a **unified, programmable structural framework** that:

- Enables dynamic, self-adjusting garment behaviour at scale
- Utilises angular panel configurations and integrated reinforcement to deliver adaptive shaping
- Eliminates the need for external fasteners, stretch fabrics, or post-production adjustment
- Maintains structural integrity, tailored shaping, and performance across diverse body types

The **method secures the entire mechanical pathway** required to achieve scalable, self-adjusting, tailored knitwear. No viable alternative mechanical route exists for achieving these outcomes within programmable knitwear production. The patented principle applies universally across programmable knitwear platforms – **securing a scalable, legally protected foundation for the next generation of responsive, structurally governed apparel.**

### Structural FIT Logic Secured by the Patent

**The only legally protected system enabling scalable, self-adjusting, tailored garments through programmable knitwear.**

#### 1. Mechanical Inter-Panel Movement

- Governs structural interaction between panels
- Enables controlled deformation and adaptability
- Forms the foundation of real-time self-adjustment

#### 2. Angular Panel Configurations & Reinforcement Elements

- Predefined angular relationships across panels
- Integrated reinforcement stabilises form and controls deformation
- Eliminates reliance on stretch materials, fasteners, or manual shaping

#### 3. Pre-Programmed Structural Shaping

- Shaping and FIT logic embedded from the design stage
- Fully executed through programmable knitwear technologies
- Guarantees scalable, precise FIT – without post-production correction

### Conclusion:

**These three structural layers function as an inseparable system – legally securing the only viable mechanical pathway for achieving real-time, self-adjusting, tailored apparel at scale.**

## 29. Legal, Technical, and Practical Boundary Review

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### No Viable Technical or Legal Alternative Across Adjacent Industries and Emerging Research.

This section evaluates, from a purely technical and operational perspective, whether woven tailoring, 3D printing, or hybrid textile systems can rival or replicate the functionality of the patented method.

### 29.1 | Technical Assessment: Adjacent Fields and Functional Limitations

*Current Adjacent Fields Cannot Provide Functional Workarounds*

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#### 29.1.1 | Woven Systems

Woven garments can deliver highly precise, sculpted FIT results – but only through complex, manual workflows fundamentally incompatible with scalable production. Precision is technically achievable at the personal tailoring or couture level, but not at industrial scale.

Achieving equivalent shaping through woven construction requires:

- Complex multi-panel pattern work
- High-skill tailoring techniques, often developed over decades of experience
- Extremely time-consuming precision cutting and construction
- Labour-intensive assembly, where even a single incorrect seam can compromise the entire structure, requiring rework. The manual skills involved must be extraordinarily precise

#### Key Limitation:

Woven systems rely entirely on rigid, predefined shaping through two-dimensional pattern making, executed manually. While form precision is possible, adaptive FIT behaviour and responsive tailoring are not.

- Woven size systems remain fragmented by necessity, requiring significantly more fixed sizes while often failing to guarantee structural FIT for those clients outside ideal proportions (see Document 2)
- Most woven fabrics do not support structural self-adjustment
- No tailoring process within the woven domain eliminates human intervention or enables affordable scale

#### Illustrative Comparison:

To replicate the same level of structural shaping now automatically integrated and produced through high-tech programmable knitting in under **3 hours**, a woven production workflow would require:

- Approximately **25 hours** of expert tailoring labour, even under optimised conditions
- A highly specialised workforce, unattainable at scale
- Layer-cutting equipment and multiple stages of manual quality control

Woven tailoring cannot provide a scalable, legally viable alternative to the patented method. It remains inherently limited by manual intervention, rigid sizing logic, and structural inflexibility.

**Most woven fabrics do not support structural self-adjustment, and no tailoring process within this domain can eliminate human intervention or scale affordably.**

### **Additional Structural and Operational Limitations:**

#### **1. Inflexible Behaviour**

- Once cut and assembled, the garment has no inherent ability to adapt
- Even bias-cut tailoring only mimics curvature – no real-time adjustment is possible

#### **2. Dependence on Skilled Labour**

- Every shaping element (e.g., dart, seam, panel) requires manual alignment and construction
- True tailoring precision depends entirely on time, expertise, and cost

### **Illustrative Comparison:**

The patented method introduces a fundamental transformation in garment production – creating an entirely new category of scalable, structurally engineered apparel. For the first time, two previously incomparable production approaches can be assessed side by side:

- Self-adjusting, structurally tailored garments produced via the patented method
- High-end, cut-and-sewn woven garments created through conventional tailoring workflows

**Key Outcome:** The patented method does not compete with woven tailoring – it replaces tailoring.

- Delivers equivalent or superior shaping precisionIntroduces engineered self-adjustment – a function woven systems cannot replicate
- Dramatically reduces labour, production time, size fragmentation, and cost

### **Strategic Impact:**

The unlimited scalability of the patented system renders traditional woven workflows functionally obsolete – across all price points and quality tiers (*see Document 2*).

### **Conclusion:**

Woven tailoring remains structurally limited, labour-intensive, and fundamentally incompatible with scalable self-adjusting garment production. The patented method redefines the pathway to achieving tailored, adaptive FIT at scale – replacing, rather than improving upon, traditional woven techniques.

## 29.1.2 | 3D Printing Systems

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3D printing offers theoretical design freedom – but today’s technologies fall short in every practical dimension required for responsive, self-adjusting clothing. The materials are often rigid, plastic-based, or chemically layered; the garments are slow to produce, inflexible by design, and unsuitable for scalable, wearable applications.

### **Current Limitations Include:**

- Rigid or semi-rigid outputs that lack stretch, drape, or real-world comfort
- Extremely slow production speeds – often hours or days per garment
- High cost per unit, making them commercially unviable for mass apparel
- Absence of native textile properties such as breathability, tension logic, and elastic recovery

### **Key Structural Limitation:**

3D printing cannot replicate the mechanical interplay of angles, reinforcement, and distributed shaping that defines the patented method. These systems do not operate within the domain of textile-based construction. They cannot simulate the structural intelligence encoded in yarn tension, knit direction, or panel interdependence – all of which are central to real-time mechanical self-adjustment.

Even proposed hybrid print-textile experiments remain entirely conceptual. To date:

- No scalable hybrid platform exists capable of combining textile behaviour with 3D printed form
- No garment produced through 3D printing has demonstrated dynamic, real-time self-adjustment equivalent to the patented system
- Any attempt to replicate the structural behaviour – through angles, reinforcement, or deformation control – inevitably falls back into the protected logic of the patented method, triggering infringement.

### **Technical Conclusion:**

3D printing remains fundamentally incompatible with the requirements of adaptive, structurally governed apparel. Even with future material innovation, scalable implementation would require:

- Entirely new infrastructure
- Industry-wide workforce retraining
- Unproven manufacturing models for real-time adaptive behaviour

As a result, 3D printing cannot offer a functional, commercially viable alternative to the patented system for producing self-adjusting, tailored garments at scale.

## 29.2 | Hybrid & Emerging Categories – Threat Containment and Domain Ownership

*(Classified under CPC: D04B, D04H, B33Y)*

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### 29.2.1 | Knitwear Legal Domain (CPC: D04B)

The patented method defines the only legally protected mechanical system currently capable of delivering scalable, real-time, self-adjusting FIT within knitwear – and, by technical extension, within apparel manufacturing using today’s commercially viable technologies.

Importantly, the scope of protection does not target a specific garment style, fashion aesthetic, or material composition. Instead, it secures an engineered system of **Structural Logic**, namely:

- The deliberate angular configuration of knit panels
- Integrated internal reinforcement structures

Together, these structural principles enable dynamic shaping and self-adjustment without reliance on sensors, fasteners, elastics, or post-production intervention.

#### Key Legal Conclusion:

Any garment or system – present or future – that implements these structural principles within knitwear construction remains within the legally protected domain of the patent, regardless of how the garment visually presents or which yarns are selected.

### 29.2.2 | 3D Printing Legal Limits (CPC: B33Y)

While 3D printing is effective for producing rigid structural geometries, it fundamentally lacks the dynamic textile behaviour that underpins the patented system. Critical distinctions include:

- **Structural Rigidity:** 3D printing produces static forms. Even when supplemented with flexible materials, these outputs cannot replicate the real-time garment responsiveness inherent to programmable knitwear.
- **Absence of Distributed Tension Control:** 3D printed systems do not exhibit the engineered loops, directional elasticity, or distributed tension mechanics required for adaptive, wearer-responsive FIT.
- **Reinforcement Deficit:** No known – or foreseeable – 3D printed platform integrates embedded structural reinforcement capable of delivering scalable, real-time self-adjustment as defined by the patented method.

### 29.2.3 | Converging Technologies: Knitwear + 3D Printing (CPC: D04B, B33Y)

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The theoretical merger of 3D printing with textile-based systems is increasingly discussed within academic and R&D environments.

However:

- No commercially viable hybrid platform currently exists that combines programmable knitwear and 3D printing to deliver self-adjusting, tailored garments.
- Even if developed, any such hybrid system that employs angular panel configurations, reinforcement logic, and mechanical interdependence to achieve real-time self-adjustment – whether partially printed, partially knitted, or structurally integrated – would directly fall within the protected logic of the patented method.
- Attempts to bypass the protected logic via hybrid materials or alternative production processes remain legally blocked if they seek to deliver equivalent adaptive shaping through structural means.

#### Strategic Conclusion

While hybridisation remains a long-term research topic, the patented method structurally dominates the only known viable pathway for achieving scalable, real-time, self-adjusting tailored apparel – both within knitwear and across any converging or hybridised textile system that seeks to deliver comparable outcomes through mechanical, **Structural Logic**.

### 29.2.3 | Future Hybrid Systems

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Hybrid systems combining 3D printed elements with knitted structures remain within the knitwear domain (CPC: D04B) when the shaping and FIT behavior originates in the knit component. In such configurations:

- The self-adjusting capability is driven by an engineered logic of movement and shaping – specifically expressed through stretch behaviour, loop directionality, and fabric deformation.
- 3D printed components may serve as external reinforcements but cannot independently initiate, control, or sustain the shaping mechanics required for adaptive FIT.
- Accordingly, any system in which knitwear constitutes the dominant structural and functional mechanism remains within the scope of the patented protection, regardless of supplementary components.

## 29.3 | Emerging Smart Materials & Sensor-Based Systems

*(Classified under CPC: D04H, G01, A41D, B29C)*

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### 29.3.1 | Definition of the Category

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Smart textiles and sensor-based apparel represent a growing field focused on garments capable of collecting data, reacting to environmental stimuli, or providing functional outputs beyond passive wear.

Common technologies include:

- Embedded sensors for motion tracking, biometric monitoring, or posture detection
- Shape-memory materials that react to heat or electrical signals
- Conductive yarns enabling basic electronic circuitry within fabric
- Externally powered modules delivering haptic feedback, heating, or illumination

These approaches operate within a fundamentally different logic compared to the patented method: they rely on **external input, energy sources, and reactive technologies**, rather than purely structural, mechanical systems for FIT and tailoring behaviour.

### 29.3.2 | Fundamental Limitation to Achieve Self-Adjusting FIT

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While smart textiles enhance functionality, they do not inherently solve the engineering challenge of scalable, real-time, structurally self-adjusting tailored FIT.

Specifically:

- Sensor-based garments measure body movement or posture but cannot physically adapt the garment's structure in real time
- Shape-memory materials offer localised deformation under specific conditions but lack continuous, wearable, responsive tailoring logic
- Electronic components add functionality but do not replace mechanical inter-panel behaviour, angular configuration, or reinforcement-based shaping

Thus, despite adding value in adjacent functionality (e.g., health monitoring, responsive insulation), these technologies do not compete with – nor provide a workaround for – the patented system's mechanical, structure-driven FIT logic.

### 29.3.3 | Potential for Combined Use – No Legal Bypass

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In principle, smart materials and electronics can be integrated with garments produced using the patented method.

However:

- Any garment that combines external sensors or functional modules with the **mechanically governed self-adjustment** system secured by the patent remains within the protected domain.
- Attempts to replicate real-time, adaptive tailoring through electronics alone – without the use of programmable knitwear and embedded Structural Logic – have not been demonstrated at scale and remain commercially unproven.
- Where structural behaviour is achieved via angular panel movement, reinforcement, and mechanical interdependence – regardless of additional smart functionality – infringement occurs.

### 29.3.4 | Strategic Conclusion

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Smart textiles and sensor-based garments address an entirely separate performance domain (data collection, environment response, passive feedback) but cannot technically replace the structural, self-adjusting behaviour secured by the patented method.

Furthermore, any hybrid systems combining smart materials with protected mechanical logic must respect the patent's legal boundaries. The only viable pathway for scalable, real-time, structurally governed FIT remains exclusively within the patented framework – whether or not external technologies are incorporated.

## 29.4 | Conceptual and Academic Pathways – Structural Barriers to Viable Alternatives

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### 29.4.1 | Anticipating Future Research

Recognising that technical breakthroughs often originate within academic or experimental environments, this section examines whether theoretical, laboratory, or conceptual developments could present a credible alternative to the patented system – particularly in the domain of self-adjusting, tailored garment structures.

**Key question:**

**Could a research-driven method – not yet commercialised – deliver scalable, real-time, structurally governed FIT without infringing the protected logic of this invention?**

### 29.4.2 | Technical Realities – Why Structural Barriers Apply Universally

The invention is rooted in fundamental, cross-disciplinary mechanical principles:

- **Structural Geometry** – Governing panel alignment, deformation, and shaping behaviour
- **Mechanical Law** – Controlling force distribution, angular interaction, and structural stability
- **Material Science Limitations** – Restricting how fabrics, composites, or synthetics behave under motion and wear

These principles apply regardless of whether a system is conceived academically or industrially.

**No laboratory theory can bypass the constraints of:**

- **How materials deform under real-world forces**
- **The requirement for interdependent panel behaviour to enable self-adjustment**
- **The impossibility of delivering scalable, tailored FIT through purely cosmetic, elastic, or reactive mechanisms alone**

### 29.4.3 | Pre-Empting Emerging Research Areas

While academic projects in **soft robotics**, **4D textiles**, and **programmable materials** show conceptual promise, they remain:

- **Structurally distinct** – focusing on actuation, shape-shifting, or material transformation, not controlled tailoring through mechanical logic.
- **Materially incompatible** – relying on complex composites or polymers not suited for scalable, wearable, breathable garments.
- **Productionally impractical** – lacking viable pathways to mass production at commercial price points.

Crucially, any attempt to replicate real-time, structurally governed self-adjustment – regardless of whether it emerges from academia, prototyping labs, or future material science – would still fall within the protected mechanical framework secured by the patent, provided it employs:

- Angular panel interaction
- Mechanical reinforcement for structural stability
- Programmable or pre-encoded deformation logic

#### 29.4.4 | Legal Safeguards Extend to Conceptual Bypass Attempts

International IP doctrines, including:

- EPC Article 69 and Protocol
  - U.S. Doctrine of Equivalents
  - China's Principle of Equivalence
- ensure that any research-derived system **functionally replicating the patented mechanical outcomes** – even through seemingly novel materials or experimental methods – constitutes **infringement** once deployed or commercialised.

The patent's structural and mechanical logic, not merely its aesthetic or material choices, defines the enforceable protection.

#### 29.4.5 | Conclusion – Pre-Emptying Future Pathways

To date, no theoretical, academic, or early-stage technological concept – whether emerging from material science, soft robotics, programmable textiles, or hybrid engineering – offers a scalable, structurally viable, or legally permissible alternative to the patented method. While research may explore adjacent ideas, such efforts remain fundamentally constrained by:

- The mechanical realities governing deformation, force distribution, and structural interdependence.
- The physical limitations of materials compatible with scalable, wearable apparel.
- The legal framework that secures all mechanically governed, self-adjusting tailoring structures within the patented scope

Even where experimental technologies propose abstract functionality – such as responsive textiles or shape-shifting composites – they lack the proven, production-ready structural logic, operational reliability, and legal clearance required for mass-market deployment.

**The patented system remains the only recognised, structurally grounded foundation for delivering real-time, self-adjusting, tailored FIT at industrial scale – across both commercial and research domains.** It defines not only the technical standard, but the legal parameters, against which all future developments will be measured.

## 30. Legal Executive Summary

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This patented invention establishes **exclusive protection** over a novel discipline in scalable knitwear engineering:

### Advanced FIT Architecture for Integrated Apparel Systems

The method transforms FIT from a reactive outcome into a pre-programmed structure of certainty – engineered in advance, repeatable at scale, and secured through the integration of angular panel logic and internal reinforcement. It does not merely influence FIT behaviour – it governs the final outcome with precision, making tailored performance a guaranteed result of the construction itself.

By legally securing the principle of bias-knit construction in all viable interpretations – reinforced through embedded structural elements and tailored free-form panels – the invention protects all mechanically viable configurations within structural apparel engineering. This includes the full spectrum of angular orientations and their corresponding real-time motion behaviours, each integrated seamlessly into garments that adapt dynamically while maintaining tailored precision – governed by mechanical law and programmed for scalable execution.

It converts a historically unstable and avoided structural condition into a patented, programmable, and fully scalable FIT Logic system – securing what the industry long dismissed as unmanageable.

#### With the Method's Chain of Execution:

#### Structural Geometry → Mechanical Law → Apparel Engineering → Programmed to Scale

This invention establishes a unified and enforceable framework for achieving mechanically governed, self-adjusting tailored FIT – through controlled angular construction, panel interaction, and internal reinforcement – across garments, methods, and production systems.

#### The scope of patent protection extends across all levels:

- **Logic** – the structural principles governing FIT behaviour
- **Method** – the process of embedding mechanical intelligence into garments
- **Garment** – any product exhibiting self-adjusting, tailored form through the patented system
- **System** – any production model built upon this architecture

Under the **Doctrine of Equivalents**, any construction applying comparable structural principles or seeking to achieve the same adaptive outcome remains within the scope of protection. No viable legal workaround currently exists: whether through woven tailoring, 3D printing, or hybrid systems, **all technically feasible alternatives fall within the protected discipline.**

**No other structure can deliver self-adjusting, tailored-structured FIT through mechanical panel movement at scale without infringing this patent – making it the sole legal and technical foundation for responsive tailoring in knitwear.** These boundaries are addressed in detail in the chapters to follow.

## 31. The Only Theoretical Bypass – Full Paradigm Shift Requirement

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### Legal, Technical, and Structural Barriers to Circumvention

The patented method – classified under **CPC D04B 1** and reinforced by cross-domain relevance to **D04H** – secures the only legally protected and technically viable system for delivering real-time, self-adjusting, tailored FIT at industrial scale.

The invention encodes structural logic through **angular knit panel orientation** and **integrated reinforcement**, producing adaptive shaping without reliance on sensors, fasteners, or post-production modification. The outcome is a scalable, programmable framework that renders conventional tailoring, size fragmentation, and manual adjustment obsolete.

### Adjacent Technologies Offer No Viable Alternative:

- **Woven Tailoring** – bound to labour-intensive workflows incapable of adaptive behaviour or scalable precision.
- **3D Printing** – while conceptually promising – lacks the dynamic elasticity and textile-based structural intelligence necessary for real-time, wearable FIT.
- **Hybrid Knit-Print Systems** – even at prototype stage – fall legally within the knitwear domain, as their shaping logic originates from programmable knit structures, making them subject to the same patent boundaries.

### Legal Safeguards Are Structurally Reinforced:

- The **27 January 2025 public disclosure (*Shaping the Future*)** strategically invalidates derivative novelty claims across emerging domains.
- Functional equivalency doctrines under **EPC, U.S., and Chinese law** ensure that any system replicating the protected structural logic – regardless of material, platform, or terminology – remains legally constrained.

### Conclusion:

The patent establishes a complete legal, technical, and economic lockout for the foreseeable future. Competing systems would face insurmountable barriers – both structurally and operationally – to deliver equivalent outcomes.

## The Only Theoretical Bypass: A Full Paradigm Shift

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To replicate the outcome of this invention – scalable, self-adjusting, tailored FIT without reliance on external mechanisms – without infringing the protected framework, a competitor would be required:

- **Reinvent the foundations of apparel engineering** – developing an entirely new manufacturing category beyond programmable knitwear.
- **Discover and globally scale mouldable textile materials** – which do not currently exist.
- **Replace the structural logic of mechanical adaptivity itself** – introducing unknown principles of movement, shaping, and controlled deformation.
- **Invest an estimated €40–60 billion over 15–20 years\*** in research, machinery, production infrastructure, and workforce retraining.
- **Accept high legal, technical, and commercial risk** – with no certainty of matching, let alone surpassing, the patented system's capabilities.

This invention cannot be bypassed through iteration.

## Structural FIT Logic — Engineered from Mechanical Principles

**Based on its Chain of Execution:**

**Structural Geometry → Mechanical Law → Apparel Engineering → Programmed to Scale**

Only a full paradigm shift – fundamentally outside all known technical pathways – could attempt to rival it.

**No such shift is in reach.**

*\* Information is available upon request and subject to NDA*

## DEFINITIVE SYSTEM SUMMARY:

### Legal, Technical, and Market Position

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**This summary outlines the legal, technical, and structural foundation of WO 2024/094577 A1. The patent protects a method that replaces static sizing with engineered Structural FIT Logic, embedding self-adjusting FIT directly into garment construction through controlled panel alignment, targeted reinforcement, and mechanically governed deformation.**

The system applies across all programmable knitwear platforms. The protection extends to any hybrid or future manufacturing method that structurally combines with programmable knitwear under the same protected logic. Adjacent fields such as woven, 3D printing, and hybrid platforms cannot independently implement this logic without infringing the patent.

**The system enables scalable implementation of self-adjusting, tailored garments with guaranteed outcomes.** It eliminates size complexity, reduces unsold inventory, preserves materials, and streamlines production without reliance on manual correction or stretch fibres compensation.

Where structural self-adjustment is achieved through **angular panel interaction, reinforcement, and controlled deformation**, it remains legally contained within the knitwear domain, regardless of material or production method.

**The legal protection secures not only the current method but the structural logic itself,** making the system future-proof across all known and emerging technologies capable of delivering equivalent mechanical outcomes.

**The structural logic is engineered, protected, future-proof, and ready for scalable implementation.**

## 32. Definitive System Summary: Legal, Technical, and Market Position.

*Consolidated overview of the patented system, market positioning, legal safeguards, and structural exclusivity*

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### Industry Limitation – The Missing Structural Method

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*WO 2024/094577 A1 protects not a product, but a principle – a structural logic by which any garment may be designed and produced at mass scale.*

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The absence of a structural approach to the mass market's core problem – **FIT** – arose from the historically efficient process of building custom-made garment constructions being translated directly into mass production without adapting its approach. If human diversity does not allow this to be adopted by default, there is a flaw from the outset:

- **within a single predefined industry size, there are over 243 variations of individual parameters.**

In the woven domain, tailoring remains fundamentally limited by structural constraints:

- Sizing is based on rigid intervals, not structural adaptability
- Garment construction relies on paper-based projections, not dynamic behaviour
- Manual work corrects after the fact, rather than engineering FIT from the start

Garments that don't fit either end up being disposed of or sold at a reduced price. This results in businesses losing money and inflating prices to cover these losses – yet the core structural limitation of mass market garment production remains unresolved.

AI and size prediction tools help – but only within the limits of garments physically produced, or those designed based on the same rigid, paper-based, calculated-by-approximation garment constructions.

The misalignment between garments and the majority of mass market wearers remains – and it must be addressed at the structural level.

**The patented method provides such a structural solution by:**

- **Fully restructuring the foundation of how the issue of FIT – and thus the alignment between garment and wearer – is addressed.**

## 32.1 The Patented Method & Cascading Benefits

### Structural FIT Logic – Replacing Approximation

The **WO 2024/094577 A1** method is the first patented system to transform FIT from a reactive, size-dependent approximation into a pre-programmed, mechanically governed structure – delivering precise, self-adjusting FIT at scale.

In doing so, the method establishes the discipline of an engineered FIT system: **Advanced FIT Architecture**.

### Structural FIT Logic –

**Structural Geometry → Mechanical Law → Apparel Engineering → Programmed to Scale**

Unlike traditional apparel systems, which rely on measurements, sensors, or manual adjustments,

Precision is engineered from the start – eliminating trial-and-error, manual adjustment, and post-production correction. Garments are no longer the end goal.

The true goal is alignment to the customer's primary need: for the garment to inherently suit the wearer – regardless of occasion, trend, or design.

**This method integrates:**

- **Angular panel alignment**
- **Internal reinforcement logic**
- **Controlled deformation paths**

Once finalised, the entire structure is fully programmed into **Preset Constructions** and executed with precision on a large scale using high-tech knitwear. This eliminates the need for external fasteners, elastic zones, or tailoring labour. The outcome is a scalable system that adapts to almost all body types by embedding the precision of tailoring directly into the production process.

This triggers a **Circular Chain of Efficiency** – scalable across garment types, markets, and production volumes – where structural precision drives savings, savings enhance scalability, and the system strengthens with every production cycle.

## 32.2 Structurally Caused Cascading System Benefits

**Pre-programmed adaptable FIT → Eliminates sizing approximations →  
Reduces excess SKU → Improves recyclability → Reduces CO<sub>2</sub> and material waste**

### System-Level Outcomes and Compound Efficiency Gains

The patented method delivers efficiency not in isolation, but through a chain of interconnected, self-reinforcing improvements – where every structural advantage amplifies operational, environmental, and economic gains across the system.

- **Predictable, Scalable FIT**

Self-adjustment and tailored shaping are structurally embedded, eliminating approximations, manual correction, and static sizing limitations. This improves customer alignment and reduces size-driven waste.

- **Structural Elimination of Size Complexity**

Fragmented sizing is replaced by engineered adaptability, reducing SKUs by up to 62.5% (3 engineered sizes replace 8 conventional). Fewer SKUs lower production complexity, streamline logistics, and minimise unsold inventory.

- **Operational Efficiency Gains**

Pre-programmed, platform-agnostic constructions simplify development, cut labour requirements by up to 99.9%, and reduce production cycles. Fewer prototypes and lower manual input compound gains achieved through size reduction.

- **Environmental Impact Reduction**

Mono-material, seamless construction, circular fibre recovery, and reduced unsold inventory, collectively deliver:

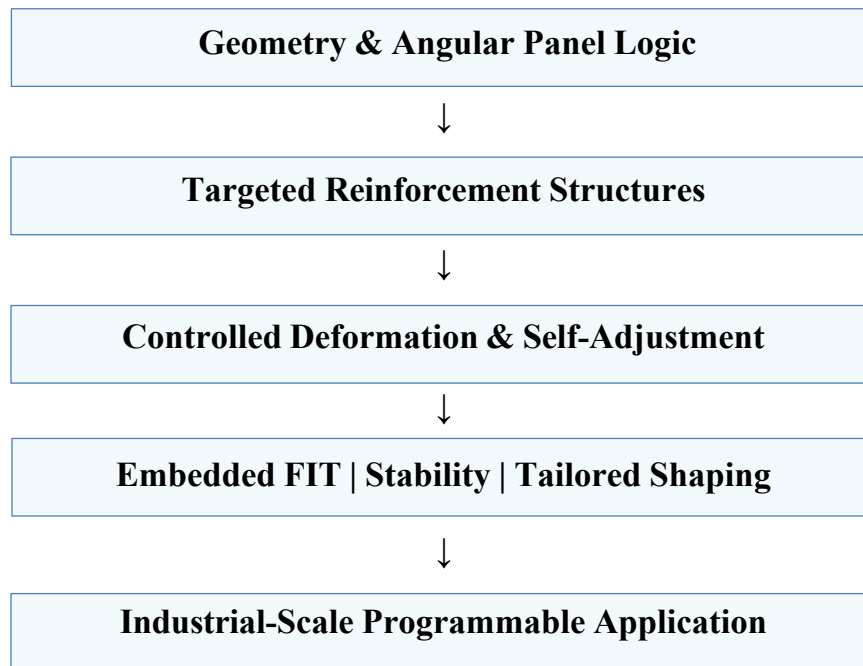
- Improved recyclability
- Reduced CO<sub>2</sub> emissions
- Material waste minimised at every stage

- **Compound Efficiency Across the Product Lifecycle**

Structural precision drives savings at each stage – design, production, sales, use, and end-of-life – with each efficiency reinforcing the next. The result: maximum scalability, minimal waste, and unprecedented resource preservation – proven, structural, and legally protected.

## 32.3 Mechanical Foundations – How Structure Replaces Approximation

The invention functions on the mechanical level: *Diagram 3:*



### 1. Geometry & Angular Panel Logic

Defines garment form and governs deformation pathways from the outset – shaping is controlled by engineered geometry, not surface approximation.

### 2. Targeted Reinforcement Structures

Stabilise key zones and manage deformation – reinforcement placement is guided by structural priorities, not aesthetic preference.

### 3. Controlled Deformation & Self-Adjustment

Deformation occurs predictably along engineered pathways – self-adjustment is inherent to the construction, not achieved through added components.

### 4. Embedded FIT, Stability, and Tailored Shaping

FIT, stability, and silhouette are built into the structure itself – no post-production correction, external fasteners, or subjective tailoring required.

### 5. Industrial-Scale Programmable Application

The full logic is translated into machine-executable instructions – ensuring consistent, scalable, legally protected garment output across all programmable knitwear platforms.

**This system replaces approximation with structural certainty – securing the only viable engineering pathway to scalable, self-adjusting, tailored apparel.**

Through engineered panel geometry, targeted reinforcement, and mechanically governed deformation, the method delivers self-adjusting, tailored garments with guaranteed FIT, stability, and performance – embedded directly into the structure.

## 32.4 Competitive Moat & Legal Lock-In

### The Only Legally and Technically Protected System for Scalable, Self-Adjusting Tailored Apparel Across All Known Mechanically Viable Pathways

The patented method establishes a structural and legal foundation that no alternative system – within all known, mechanically viable pathways for scalable, self-adjusting tailored apparel – can bypass without infringing the protected principles.

Unlike contemporary garment technologies that rely on AI, sensors, elastic compensation, or manual tailoring, **this invention governs FIT through mechanical law** – embedding Structural Logic directly into the construction of the garment itself.

#### Structural Exclusivity Through Mechanically Governed Logic

The method achieves scalable, self-adjusting, tailored structures through three core engineering principles:

- **Angular panel alignment** – governing deformation and shaping through mechanically controlled angles
- **Internal reinforcement logic** – distributing mechanical stability while enabling targeted adaptability
- **Controlled deformation paths** – enabling real-time self-adjustment without compromising structure

**Once finalised, the entire structure is pre-programmed into Preset Constructions and executed with precision using programmable knitwear platforms.** This eliminates sizing approximations, manual correction, and tailoring labour – delivering structural precision directly at the production stage.

**The result is a scalable, production-ready system that enables consistent, self-adjusting, tailored garments at industrial scale worldwide.** Structural FIT is embedded from the outset, replacing reactive adjustments with engineered certainty.

**With today's programmable knitwear infrastructure and existing precision capabilities, global production of over 190 million perfectly fitting garments is already achievable.** This demonstrates that the system is not theoretical – it is fully compatible with existing technology and ready for immediate market deployment.

## 32.5 Structural Disruption – Industry-Ready Implementation

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The method integrates Structural FIT Logic directly into existing programmable knitwear infrastructure – no technical barriers, no re-engineering of production lines, and no redesign of core technology required.

### **Readiness:**

- The structural logic – fully engineered, protected, and universally applicable
- Seamless compatibility with all 2- and 4-bed programmable knitwear platforms
- Operates on standard industry software – no special systems required
- Pre-programmed constructions provided where developed – ready for immediate use
- Brand-specific designs – shape, style, or aesthetic – applied independently

### **Adaptability:**

- New garment types, categories, and design variations – engineered with the same protected method
- Unlimited scalability – once constructions are pre-programmed, they transfer instantly across production environments

### **The breakthrough:**

A single structural method replaces sizing, misfit, and manual adjustments – at scale, without added complexity – with garment development proceeding efficiently, based on a structurally governed, legally protected foundation.

## 32.6 Legally Locked Across Materials, Machines, and Domains

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### *From Geometry to Guaranteed FIT — The Mechanical Chain of Logic*

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The protection extends beyond knitwear – securing the only known mechanically viable principle for scalable, self-adjusting tailored garments, regardless of:

- **Machine type** – 2-bed, 4-bed, or future programmable platforms
- **Material domain** – knitwear, woven adaptations, hybrid or conceptual systems
- **Production method** – any process embedding mechanically governed panel logic and targeted reinforcement

**The method is:**

- Not defined by programming logic
- Not reliant on specific machines
- Not dependent on digital tools for mechanical functionality – but uses them for scalable, repeatable execution

Any system, garment, or process replicating the patented **Structural FIT Logic** – whether through equivalent methods, hybrid adaptations, or alternative platforms – falls within the protected scope.

## 32.7 Global Legal Safeguards

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The invention is legally protected across all major jurisdictions, supported by established Equivalence Doctrines:

- **Europe** – EPC Art. 69 + Protocol (functional equivalents protected)
- **United States** – Doctrine of Equivalents (functionally identical outcomes protected)
- **China** – Principle of Equivalence (technical effect governs infringement)

### Summary Enforcement Criteria:

If a garment performs the same structural function – delivering scalable, real-time, self-adjusting FIT through mechanically governed deformation and targeted reinforcement – it falls within the protected scope, regardless of design, material, or production method.

### Full Structural Protection Across Four Levels:

- **Logic Level** – Structural principles governing FIT behaviour
- **Method Level** – Processes embedding mechanical intelligence into garments
- **Garment Level** – Final products exhibiting self-adjusting, tailored structure
- **System Level** – Any production model built upon this architecture

### No Legal Workaround Exists

Whether through:

- Woven tailoring attempting to replicate angular panel alignment
- 3D-printed or hybrid constructions mimicking targeted reinforcement
- Future conceptual systems implementing mechanical panel interaction

### All technically viable alternatives fall within the patented discipline.

No other structure delivers self-adjusting, tailored-structured FIT through mechanical panel movement at scale without infringing this patent.

### Conclusion:

This method does not optimise tailoring – it fundamentally restructures how apparel is engineered, embedding FIT, stability, and adaptability as a guaranteed, programmable outcome.

It establishes not only technical superiority but legally locked market exclusivity – making it the sole viable, protected foundation for scalable, responsive tailoring in knitwear and beyond.

## 32.8 System Architecture: Streamlined Effortless Replacement of Size Complexity

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Size complexity is no longer managed – it's eliminated at the structural level.

The method replaces fragmented sizing with a mechanically governed system – removing the need for size approximations, stretch compensation, or post-production correction.

### Sizing, redefined through structure – not convention.

The foundation is mechanical:

- **Angular panel logic** – governs shaping through engineered geometry
- **Mechanical tension distribution** – regulates deformation under motion
- **Targeted reinforcement** – stabilises form and defines shape boundaries
- **Controlled deformation** – enables real-time adaptability without collapse

These are physical behaviours, structurally embedded during construction. FIT is no longer tied to static size labels – it emerges from the dynamic interaction of engineered geometry and body movement.

### Structural FIT Parameters

- $\pm 1.5$  size adaptive range per programmed construction
- Three pre-engineered sizes replace eight conventional sizes.
- Controlled deformation within engineered structural boundaries
- Predictable and scalable FIT across diverse anatomies

### Size Formation – How Structural FIT Replaces Conventional Sizing

Conventional sizing divides populations into rigid intervals, forcing fixed constructions over diverse body types. This system replaces that with engineered structures that actively adapt.

Each programmed construction applies identical structural logic – governing FIT, deformation, and stability – across all included body types. Whether within one conventional size or spanning  $\pm 1.5$  sizes, the structural behaviour remains consistent.

### Example:

A construction engineered between sizes 38–40 IT reliably covers wearers from 36 to 42 IT – delivering consistent, structurally tailored FIT across that full range. The same logic applies to every programmed construction. scalability:

**Engineered, Structurally Governed at Scale FIT**

The system eliminates the historical trade-off between precision and scalability:

- No customisation required
- No post-production adjustments
- No reliance on elastics, fasteners, or manual correction
- No manual grading or sizing approximations

The **3-Size Model** replaces 8 conventional sizes as a direct outcome of the system's self-adjustment logic – removing complexity with engineered precision at scale.

**Conclusion:**

The method systematically replaces static size approximations with structural mechanical certainty – scaling precise, self-adjusting, tailored FIT for the mass market without compromise.

## 32.9 Summary of Industry-Scale Impact

### Sizing ↔ Inventory ↔ Production ↔ Resale ↔ Recycling

The patented method delivers the only **structurally viable system for scalable, self-adjusting, tailored apparel**, governed by mechanically controlled panel movement.

It is also the only **legally protected system** capable of delivering this outcome – ready for immediate industry implementation.

This is not an optimisation of tailoring or knitwear. It is a **structurally novel method** that unifies both domains, eliminating the long-standing limitations that prevent scalable, high-precision apparel production.

**The method eliminates:**

- **Structural Limitations:**
  - Static sizing systems that cannot replicate the precision of custom tailoring
  - The mismatch between fixed sizes and variable human proportions
- **Material and Construction Limitations:**
  - The rigidity of cut-and-sew garments that cannot adapt to body movement
  - Stretch-dependent knitwear lacking controlled structural shaping
- **Operational Inefficiencies:**
  - Manual tailoring and personalisation efforts – whether applied individually or at mass scale

This is not a surface-level improvement. It is a **structural re-foundation of garment engineering**, embedding precise FIT, stability, and adaptability directly into the construction – transforming apparel into a scalable, legally protected system with guaranteed outcomes.

### System Architecture: Structural Logic of FIT

The patented method establishes a new engineering discipline: **Advanced FIT Architecture**

- Governed by mechanical panel interdependence
- Delivered through angular alignment, targeted reinforcement, and controlled deformation
- Pre-programmed for industrial-scale production

**The result is guaranteed structural FIT – scalable, predictable, and legally secured – at any production volume.**

## 32.9.1 A Shift from Approximation-Driven, Compensatory Production to Structurally Governed Apparel

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The patented method restructures the development and production chain by embedding structural precision from the outset. Apparel is treated as a full-stack system – removing reliance on reactive corrections and manual adjustments at later stages.

### Conventional Systems – Approximation-Driven and Compensatory

*Design → Development → Production → Final Customer*

- FIT outcomes are unpredictable at the final customer level
- Sizing depends on static intervals, not structural adaptability
- Design success depends on development working within rigid structural constraints
- Development success depends on production consistency – variability across factories directly affects final garment quality
- Up to 243 FIT variations per size remain unaddressed at structural level
- High unsold inventory due to FIT mismatch
- Manual correction is frequently required after production
- Inconsistent scalability and quality across production sites

### System Design of the Patented Method – Structurally Governed for Predictable Outcomes

*Development for Guaranteed Outcome → Design → Streamlined Production → Guaranteed Outcome for the Customer*

- Structural FIT engineered from the start
- Development precedes design – structural logic dictates form
- Pre-programmed, production-ready constructions – built to scale
- Self-adjusting, tailored garments with guaranteed FIT across nearly the full spectrum of anatomical diversity – within the system's adaptive range
- Predictable, repeatable production outcomes – independent of factory variability or manual skill levels
- Scalable without reliance on individual craftsmanship, tailoring adjustments, or elastic compensation
- Significantly reduced development cycles and production costs compared to tailored cut-and-sew
- Structural precision embedded into the garment itself – eliminating the need for reactive adjustments later in the process

## 32.9.2 System-Level Advantages: Value Preservation, Operational Efficiency, and Legal Exclusivity

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- **Perfect FIT & Adaptive Sizing** → Eliminates returns, waste and unsold inventory
  - **Resource Allocation Modelling** → Minimises fibre and material waste at the pre-design stage
  - **Energy Efficiency Optimisation** → Reduces energy consumption at scale
  - **Intelligent supply chain planning** → Optimises logistics, reduces emissions and costs
  - **End-of-Life & Recycling Automation** → Creates a structured path for circularity and reuse.
- 

### Value Preservation

The system safeguards material value at every stage – extending garment life, preserving fibre integrity, and enabling circular reuse at scale. Luxury fibres are fully preserved and recovered without degradation, making premium, long-life garments viable for mass production.

### New Value Generation

The system enables waste-free precision FIT, scalable tailoring quality from mass-market to luxury, and eliminates the cost, complexity, and environmental burden of conventional garment production. Dynamic, self-adjusting garments maintain structure and FIT throughout their lifecycle, reducing replacements, returns, and material loss.

### Operational Efficiency and Scalability

The method unifies development, design, and production within a structurally governed system – eliminating manual grading, personalisation tools, and size-based fragmentation. One operator can manage up to 50 machines, scaling production without additional infrastructure, manual labour, or unsustainable material use.

### Environmental and Economic Impact

The system structurally prevents waste and emissions – delivering measurable reductions in material use, production waste, transport volume, and CO<sub>2</sub> emissions, with verified compound improvements exceeding isolated production-stage efficiencies.

### Legal Exclusivity and Market Protection

All scalable pathways for self-adjusting, tailored garments – whether present or emerging – fall within the protected scope. No woven, 3D-printed, hybrid, or conceptual systems can legally deliver equivalent outcomes without infringing the patent. **The structural logic is engineered, protected, future-proof, and ready for scalable implementation. The market can no longer rely on approximation. Precision is structurally embedded – from material selection to end-of-life recovery.**

### 32.9.3 System-Level Advantages

The patented method achieves compounded, system-wide gains by replacing fragmented processes with a unified, scalable system. As inefficiencies are eliminated, profitability, resource recovery and precision increase. No existing method, whether in woven tailoring, knitwear or conceptually, delivers this level of controlled production, structural FIT and environmental efficiency at scale. This is not optimisation; it is engineered replacement.

- Predictability & Accuracy → Every aspect of production (FIT, energy use, logistics, CO<sub>2</sub> impact) can be pre-calculated, eliminating uncertainty.
- Automated optimisation → Real-time computational models dynamically adjust parameters before production even begins, ensuring efficiency.
- Scalability & practical implementation → A standardised framework can be applied across any plant, site or supply chain for consistent results.
- AI-driven decision making → AI analyses historical data to predict demand, reduce waste and optimise machine settings in real time.
- From estimates to proven results → Rather than vague sustainability claims, a programme-based model provides verifiable figures for CO<sub>2</sub> reduction, energy savings and production efficiency.

#### Key metrics:

1. Production Time Reduction: – 84.0%
2. Production Cost Reduction: – 73.7%
3. Skilled Workforce Reduction: – 99.9%
4. Space Efficiency: + 99%
5. Unsold Rate Reduction Potential : – 78.6%
6. Inventory Reduction Potential: – 62.5%
7. Return Rate Reduction Potential: – 71.4%
8. Adjusted Production Cost Reduction Including Unsold: – 76.8%
9. Waste Reduction Including Unsold Garments: – 82.4%
10. Waste Reduction per Garment Sold: – 84.9%
11. Waste Reduction Potential due to Size Mismatch with Unsold Garments\*: – 85.3%
12. Waste Reduction Enabled by Expanded Customer Reach: – 85.3%
13. Electricity Use Reduction: – 66.7%
14. CO<sub>2</sub> Emissions Reduction per Garment Produced: – 68.4%
15. CO<sub>2</sub> Emissions Reduction per Garment with Sustainable Recycled Fibre for Luxury Apparel: – 72.0%
16. Warehousing Space Reduction Potential: – 80%
17. Warehousing Emissions Reduction: – 81.6%
18. Fibre Recovery with an Increased Efficiency: 54.5% +
19. Luxury Fibre Waste Reduction: 91.2%
20. Recycling Efficiency: +54.5%
21. Reduced Recycling Costs: – 77.8%
22. Projected Increase in Gross Profit from Resale: + 61.3%
23. Increase in Net Profit: + 235%
24. Potential CO<sub>2</sub> Emissions Avoided: – 22.6 million tonnes of CO<sub>2</sub>

## 32.9.4 EXAMPLE 1 Luxury Fibre Preservation – Compound Efficiency Enabled by the Patented System (Up to 96%)

The patented method delivers structural efficiency that preserves fibre at every stage – making even the world’s **most expensive luxury fibres economically viable at scale**. This is achieved not through material substitution or quality compromise, but through engineered FIT, self-adjustment, and seamless, mono-material construction that eliminates waste, overproduction, and unsold inventory.

**The system prevents fibre waste at every stage:**

- **Production:** No cutting waste
- **Sales:** Fewer unsold garments
- **Use Phase:** Extended lifespan via durable, self-adjusting FIT
- **End-of-Life:** High-quality fibre recovery supports true circularity

### Step 1: Structural Elimination of Production Waste

Conventional woven tailoring produces significant fibre waste. The patented method restructures this process:

- Seamless, mono-material construction – no cutting scraps or off-cuts
- Nearly **100% of luxury fibre preserved** at the production stage.

### Step 2: Self-Adjusting FIT Reduces Unsold Garments

Rigid sizing structures force overproduction across sizes, wasting luxury fibre. The patented system replaces this with structural self-adjustment:

- $\pm 1.5$  size adaptive range per garment
- 3 programmed constructions replace 8 conventional sizes
- Up to **78.6%** reduction in unsold garments due to size mismatch
- Highest-value fibre preserved – not discarded

**Step 3: Total Luxury Fibre Waste Reduction – Up to 91.2% Preservation per Garment Sold:** The system combines reduced production waste with a drastic reduction in unsold garments rate. **Predictable**

### Circularity and Fibre Recovery:

- Mono-material construction simplifies recycling
- No embedded hardware or mixed materials
- Up to **85%** luxury fibre recovery at premium quality standards

**Conclusion:** This compound efficiency is only possible because the patented method structurally restructures the garment itself – embedding FIT, stability, and material logic directly into construction. The result: luxury garments with tailored precision, fibre preservation, and unprecedented scalability. **True luxury quality becomes affordable – not by lowering standards, but by structurally eliminating inefficiencies.**

## 32.9.5 EXAMPLE 2 – CO<sub>2</sub> Reduction – Compound Environmental Efficiency Enabled by the Patented System

The patented method delivers structural efficiency that reduces CO<sub>2</sub> emissions at every stage of the product lifecycle. It eliminates waste, excess production, and unsold inventory. CO<sub>2</sub> emissions reductions at every stage:

- **Production:** eliminates cutting waste, minimises material use, and reduces energy consumption
- **Sales:** Structural self-adjustment reduces unsold, cutting associated production and transport emissions
- **Use Phase:** Long-lasting, self-adjusting FIT extends garment lifespan, reducing the frequency of replacements
- **End-of-Life:** High-quality fibre recovery supports true circularity, preventing landfill and incineration emissions

**Step 1: Structural Elimination of CO<sub>2</sub> During Production.** Conventional woven tailoring and cut-and-sew methods generate significant CO<sub>2</sub> emissions through material waste, labour-intensive processes, and inefficiencies. The patented method restructures this process:

- Mono-material, seamless construction reduces direct CO<sub>2</sub> emissions per garment by 68.4%
- Applied to garments using recycled fibres, total production-stage CO<sub>2</sub> emissions are reduced by up to 72.0%

**Step 2: Structural Elimination of CO<sub>2</sub> from Unsold Garments.** Rigid sizing structures force overproduction, resulting in unsold garments that inflate CO<sub>2</sub> emissions unnecessarily. The patented system replaces this with structural self-adjustment:

- ±1.5 size adaptive range per garment reduces size fragmentation
- Three programmed constructions replace eight conventional sizes
- Unsold garment rate reduced by up to 78.6%, preventing CO<sub>2</sub> emissions associated with excess production, transport, and disposal

**Step 3: Total CO<sub>2</sub> Reduction per Garment Sold – Up to 90.5% Reduction Achieved.** The combined structural efficiencies reduce the CO<sub>2</sub> burden across the full product lifecycle. Predictable, scalable FIT and mono-material construction eliminate waste-driven emissions:

- Baseline CO<sub>2</sub> reduction per garment produced: 68.4%
- Adjusted for reduced unsold inventory, total CO<sub>2</sub> emissions per garment sold decrease by 72.9%
- With recycled fibres applied, total CO<sub>2</sub> reduction per garment sold exceeds 90%

**Conclusion:** This compound environmental efficiency is only possible because the patented method structurally restructures garment production – embedding FIT, stability, and material logic directly into construction. The result: garments with tailored precision, minimal waste, and dramatically lower CO<sub>2</sub> emissions at scale. Sustainable production becomes economically viable – not by lowering standards, but by structurally eliminating inefficiencies.

## 32.10 Inherent Structural Limitations of Existing Apparel Technologies

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### WOVEN

Paper patterns remain fixed within two-dimensional limitations, constructing garments by approximating averaged population data divided into equal intervals. The result is compounded by the fact that most woven fabrics offer little stretch or flexibility. **This locks garments into rigid, static constructions applied across over 200 distinct body types per size – embedding misalignment and structural inaccuracy into every garment.** This is why it is not uncommon for 20–30% of inventory to remain unsold due to the so-called “size” mismatch – when in reality, it is a FIT mismatch.

### KNITWEAR

Any knit construction remains dependent on general shaping, with precision reliant on elastic yarns or the inherent elasticity of knitwear as compensation. Without embedded Structural Logic, **shaping lacks stability, deforms under wear, or breaks down in stress zones** – making scalable, reliable FIT and durable, form-fitting garments unachievable.

**Programmable Knitwear** – Even with advanced programming, shaping depends on manually created curves and side constructions – a time-intensive process that remains inherently generalised, unless preset constructions from existing databases are used. Without embedded Structural Logic, garments may appear fitted, but **lack controlled form and structural stability** required to define and preserve garment shape. During motion, stress zones tighten unpredictably, leading to discomfort and subtle shape distortion. The result is a **visual approximation of FIT** – acceptable in appearance, but lacking anchored structure – making true tailored precision, especially in motion, unattainable at scale.

### 3D PRINT – Conceptually Promising, Structurally Incompatible

Despite speculative advances, 3D printing remains fundamentally unfit for scalable, self-adjusting, tailored apparel. Current systems produce rigid, slow, and structurally incompatible outputs – lacking the elasticity, deformation control, and real-time adaptability essential for garments. No 3D printed platform replicates the embedded structural logic of panel interaction or integrated reinforcement secured by this invention.

**Matching the outcomes of Structural FIT Logic would demand an entirely new manufacturing category, unknown materials, and decades of costly R&D – while the patented method delivers scalable, self-adjusting FIT today through programmable knitwear.**

## 32.11 Future-Proof Protection and Adjacent Fields – Structural Boundaries Secured

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The patented system is not defined by garment type, production method, or material selection. It secures a universal structural logic governing adaptive form and function, applicable across materials, industries, and emerging technologies.

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### 32.11.1 Future-Proof by Design – Structural Logic, Not Textile Terminology

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The invention defines FIT as structural alignment: the controlled interaction of forces and shapes between garment and body. This is governed by:

- Angular panel logic
- Mechanical tension distribution
- Reinforcement zones
- Controlled deformation

These are technical, physical behaviours rooted in mechanical engineering and material science – not dependent on conventional design language or production methods. The claim set redefines, rather than excludes, conventional textile concepts such as selvage or bias – framing them through structural logic as any angle deviating from the knit direction. In programmable knitwear, where panels can be repositioned and rotated in any direction, this structural interpretation ensures that protection applies broadly across:

- Three-dimensional shaping logic
- Flat-to-form transitions
- Any knit, composite, or hybrid system where panels, angles, and edges exist

Any structure that applies angular panel geometry to deliver controlled deformation, dynamic shaping, and reinforced stability falls within the protected scope, regardless of terminology, material, or machinery.

### 32.11.2 Adjacent Fields – No Viable Technical or Legal Alternative

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Across all adjacent industries and technological approaches, the same structural limitations persist.

- **Woven Systems**  
Precision in woven tailoring is achievable only through manual intervention. Structural adaptability and real-time self-adjustment are fundamentally incompatible with woven systems. Attempts to replicate structural logic through mechanical reinforcement or angular panel interaction within woven production fall within the protected legal domain.
- **3D Printing and Hybrid Platforms**  
Existing 3D printing outputs remain rigid and unsuitable for adaptive, wearable applications. Speculative hybrid systems that combine 3D-printed components with textile structures cannot

independently initiate or sustain adaptive shaping. Any hybrid platform replicating angular panel logic, reinforcement, or mechanical interdependence to achieve real-time self-adjustment falls within the patented scope.

- **Smart Textiles and Sensor-Based Systems**  
Sensor-embedded garments, shape-memory materials, and functional smart textiles can enhance functionality but cannot structurally govern FIT. These systems do not provide a technical substitute for mechanically governed deformation and shaping.
- The **27 January 2025 public disclosure** ("*Shaping the Future*")\* strategically invalidates derivative novelty claims across emerging domains.

### 32.11.3 Structural Law Across Materials, Machines, and Domains

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The patent secures a legally protected structural framework applicable across:

- **Material Domain**  
All yarns, fibres, composite materials, or smart-textiles capable of carrying structural logic.
- **Machinery Domain**  
All programmable knitting systems, including two-bed and four-bed platforms, and any future machinery replicating angular panel interaction or reinforcement logic.
- **Application Domain**  
Any sector requiring real-time self-adjustment with tailored structure, including apparel, medical, sportswear, industrial, and adaptive equipment.
- **Manufacturing Domain**  
All production systems that embed structural self-adjustment, regardless of material, platform, or production method.

### 32.11.4 Beyond Apparel – Universal Structural Logic

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The underlying engineering logic of the patented system applies beyond the apparel sector. It governs:

- Spatial correlation between structural parts
- Mechanical dependency of components to achieve structural stability
- Dynamic, three-dimensional shaping based on internal, programmed deformation
- Programmable, machine-executable precision outcomes

This structural logic applies to any adaptive form where structure must align or adjust in real time. Relevant application areas include performance garments, medical supports, footwear uppers, protective equipment, technical structures, and aerospace components.

**The logic remains constant regardless of material selection or product category.**

\* "*Shaping the Future*" [https://www.linkedin.com/posts/nataliya-dolenko-84702a218\\_shaping-future-nataliya-dolenko-geneveconcept-activity-7289549871223590912-KaSL?utm\\_source=share&utm\\_medium=member\\_desktop&rcm=ACoAADbSKjcBiCM1zP5QeLaZ0IH6NNFHZ2efkoc](https://www.linkedin.com/posts/nataliya-dolenko-84702a218_shaping-future-nataliya-dolenko-geneveconcept-activity-7289549871223590912-KaSL?utm_source=share&utm_medium=member_desktop&rcm=ACoAADbSKjcBiCM1zP5QeLaZ0IH6NNFHZ2efkoc)

### 32.11.5 Legal Boundaries Locked Across Future Pathways

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Any present or future system that replicates the mechanical outcomes of angular panel interaction, mechanical reinforcement, and self-adjusting, tailored structure falls within the protected scope of the patent. This applies irrespective of material composition, production method, or technological platform.

The protection is reinforced by international legal doctrines, including:

- European Patent Convention Article 69 and Protocol
- United States Doctrine of Equivalents
- Chinese Principle of Equivalence
- Guaranteed FIT

There are no known technical or legal workarounds through woven tailoring, 3D printing, hybrid systems, smart textiles, or conceptual research that bypass the protected structural framework.

### 32.11.6 Conclusion: Structural Exclusivity, Future-Proof Protection Total Market Control

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The patented system defines the only technically viable, legally protected pathway to scalable, self-adjusting, tailored structures – in knitwear and beyond. No other structure delivers:

- Guaranteed FIT
- Structural adaptability
- Industrial scalability
- Legal exclusivity

The structural logic is universal.

The legal boundaries are locked.

Market deployment remains entirely controlled by the patent owner.

### 33. CORRMETH™ Advanced FIT Architecture – Terminology

| Concept                                           | Term                                               | Definition / Usage Guidance                                                                                                                                           |
|---------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <i>Protected domain name</i>                   | <b>Advanced FIT Architecture</b>                   | The novel, protected domain established by the patented method, describing the engineered, systematised approach to scalable garment FIT.                             |
| 2. <i>System definition</i>                       | <b>Structural FIT Logic</b>                        | The integrated, legally protected system where tailoring, shaping, and adaptive FIT are embedded directly into the garment's structure, not applied after production. |
| 3. <i>Structural foundation of FIT</i>            | <b>Structural Logic</b>                            | The core patented engineering principle, independent of material or visual outcome. Describes how structure governs garment form and FIT.                             |
| 4. <i>Pre-programmed garment structure</i>        | <b>Preset Constructions</b>                        | Pre-engineered garment structures designed for self-adjustment and structural stability, programmed before production.                                                |
| 5. <i>Structural panel coordination principle</i> | <b>Mechanically Based Inter-Panel Logic</b>        | The engineered structural principle governing how garment panels interact to enable scalable self-adjustment and dynamic FIT.                                         |
| 6. <i>Real-time panel interaction behaviour</i>   | <b>Mechanically Governed Panel Interdependence</b> | The structural behaviour of panels adjusting together as designed, ensuring predictable FIT, controlled shaping, and structural stability.                            |
| 7. <i>Engineering foundation of structure</i>     | <b>Structurally Optimised Structure</b>            | Garment construction engineered to maintain tailored form, stability, and FIT – without relying on stretch, external fasteners, or manual tailoring.                  |
| 8. <i>Core application outcome</i>                | <b>Self-Adjusting Garments</b>                     | Garments engineered to dynamically adapt to the wearer's body within defined parameters, requiring no alterations, sensors, or elastic reliance.                      |
| 9. <i>How FIT physically emerges</i>              | <b>Activated Structural Correlation</b>            | The structural interaction between panels that generates FIT – a precise, engineered outcome, not an aesthetic approximation or stretch-dependent result.             |

*The terms “Structural FIT Logic” and “Advanced FIT Architecture” refer to the proprietary system developed by NATALIYA DOLENKO GENÈVE SA as protected under WO 2024/094577 A1. Use of these terms to describe apparel, production methods, or technologies without licensed access to the patented system constitutes misleading representation.*

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