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For:

Modern Meadow, Inc.
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Attention:
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By FedEx

Ms. April Tabor
Secretary of the Federal Trade Commission
Federal Trade Commission
600 Pennsylvania Ave.
Washington, DC 20580

Re: Modern Meadow's Request for Designation of New Generic Fiber Name, "VERA"

Dear April,

On behalf of Modern Meadow, Inc., I hereby submit this application requesting the designation of a new generic fiber name "VERA" and definition pursuant to 16 CFR §303.8.

VERA manufactured by Modern Meadow is a unique textile material that is made from their proprietary system for combining select proteins with biobased polymers. This revolutionary material provides a much-needed non-animal alternative to leather, offering similar texture, appearance, and characteristics of leather.

You will find enclosed detailed evidence and data to substantiate the need to designate a new generic fiber name, as existing generic names don't adequately demonstrate the same characteristics of this material.

If you have any questions or comments on this application or seek additional information, please contact me or Nicholas Yaraghi of Modern Meadow.

Sincerely,


Bopanna (Ronnie) Poonacha

Request for Designation of New Generic Fiber

Attn: Ms. April Tabor



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1.0 Background

1.1 Modern Meadow

Founded in 2011 and based in Nutley, New Jersey, Modern Meadow designs innovative biomaterials inspired by nature. They specialize in developing sustainable materials that offer high performance while reducing environmental impact. Their cutting-edge technologies allow them to create biosynthetic alternatives to traditional materials, paving the way for a more sustainable future across various industries.

Known for creating an animal-free, bio-fabricated leather alternative, Modern Meadow has continually expanded the potential of its technologies to serve multiple industries with scalable, more sustainable solutions.

Modern Meadow has received multiple patents for its innovative methodology to synthesize materials.

VERA is the culmination of this expertise: a Next-Gen transformative material crafted using plant-based proteins, biopolymers and recycled nylon-6 derived from rubber waste, resulting in more than 80% renewable carbon content. It is one such textile material that is masterfully engineered to replicate the look and feel of the collagen found in leather. It is completely animal-free.

VERA is already commercially available, and has received positive acceptance in the industry, ranging from automotive brands, to furniture, to footwear and handbags. It will also be commercially available for use in clothing and accessories.

1.2 VERA

VERA is an innovative textile composed of plant proteins, biopolymers, and chemically recycled nylon-6 engineered to achieve the same look and feel of collagen in leather. Bio-Alloy[®]

It is built using a soy protein structure (known as Bio-Alloy[®]) and a structurally engineered chemically recycled nylon-6 [REDACTED] that closely emulates the natural properties of collagen and structure found in leather. It is specifically crafted for compatibility with traditional post-tanning and finishing processes, which are essential for achieving authentic leather-like properties. The efficient adherence of VERA substrate to dyes, fat liquors, and other important tanning chemistries allows VERA to achieve high quality looks and haptics essential to achieving that Leather-like appearance and texture.

Among the many benefits of this approach is it allows us to engineer a material with an expanded color range and haptics (e.g., softness, smooth touch, fullness), higher material strength, and an overall lighter weight canvas for designers to work with.

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[REDACTED]

[REDACTED]

Bio-Alloy® Background

Bio-Alloy® is a miscible blend of plant protein and biopolymer resulting in unique properties not inherent to its individual components. [REDACTED]

[REDACTED] The polyurethane is comprised of a “soft segment” phase and a crystalline “hard segment” phase that are separated by differences in polarity. [REDACTED]

[REDACTED] The “hard phase” for the polyurethane comprises the urethane segments of the polymer that are imparted by the isocyanate(s) used to connect the polyols along with short chain diols such as butane diol, propane diol, and the like. These units are more polar and rigid than the polyols used to make the soft segment. Therefore, the hard segment has a higher softening point compared to the soft segment. The function of the hard phase is to provide, among other properties, stiffness, strength, temperature resistance, and abrasion resistance to the polyurethane.

The plant protein used in Bio-Alloy® is a soy protein [REDACTED]. Soy protein is primarily comprised of beta-conglycinin and glycinin protein fractions. Glycinin is a hexameric protein, often referred to as 11S globulin, is made up of six basic and six acidic subunits bonded by disulfide bonding, forming a hexamer structure. β -conglycinin, often referred to as 7S globulin, is a trimeric glycoprotein composed of composed of α , α' , and β subunits. [REDACTED]

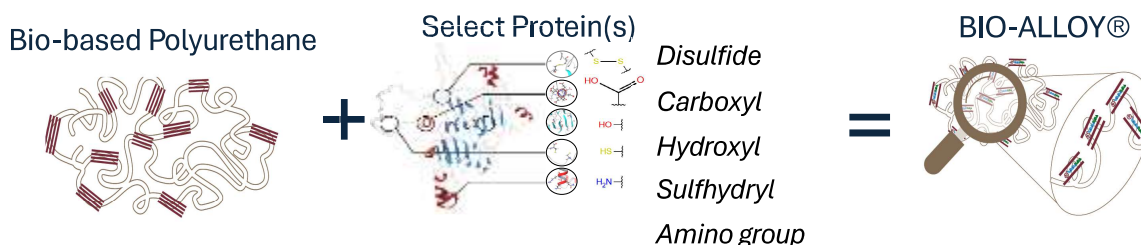
[REDACTED] Polar functional groups, such as carboxyl, hydroxyl, and amine groups from the soy protein interact with available polar functional groups in the hard segment of the polyurethane [REDACTED], reinforce the hard phase of the PU, and form a miscible blend.

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Figure 2. Bio-Alloy® Composition and Structure



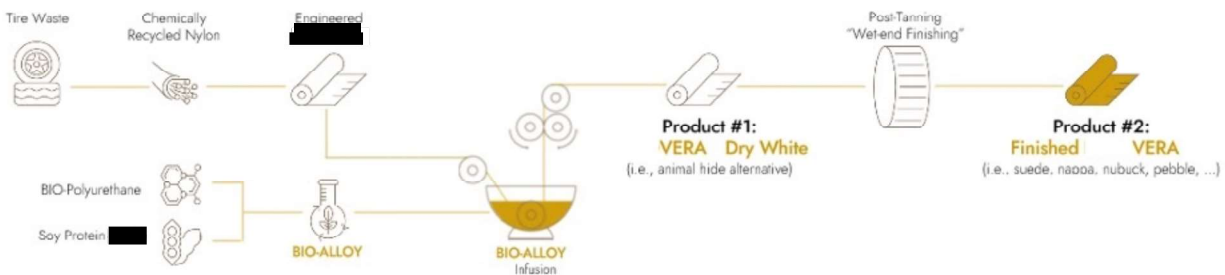
Bio-Alloy® imparts distinct physical properties and functionalities not inherent to nylon, with reactive groups such as disulfide, carboxyl, hydroxyl, sulfhydryl, and amino groups, enabling the interaction with post-tanning chemistries, such as dyes, tanning agents, and fat liquors. Furthermore, the nylon [REDACTED] structure is engineered to mimic the structure of collagen fibers found in animal leather and is stabilized with Bio-Alloy® to provide, but not limited to, durability while maintaining desirable haptics after post-tanning.

VERA Manufacturing Process

VERA is manufactured by impregnating a structurally engineered recycled nylon-6 [REDACTED] with a Bio-Alloy® solution [REDACTED]. Bio-Alloy® uniformly coats the surface of nylon fibers throughout the textile substrate. [REDACTED]

The material is then put through traditional leather post-tanning processes and can additionally be processed to produce a suede through traditional leather processes such as staking, buffing, and milling. The crust can also be finished, similar to leather, to provide a smooth and protective surface by applying surface coating chemistries such as polyurethanes and acrylics by spray, roller-coater, and reverse transfer processes. The finished articles are analogous to full-grain leather material (e.g., nappa, pebble, etc.).

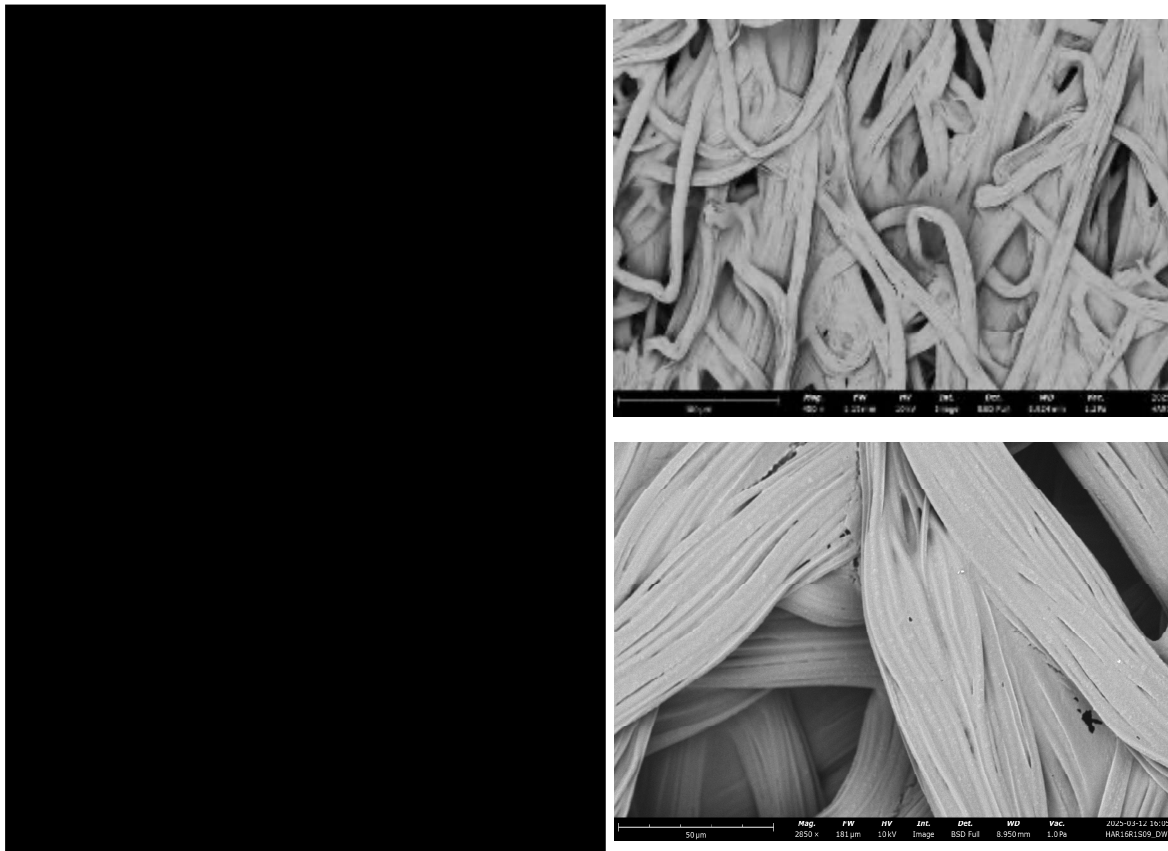
Figure 3. VERA Manufacturing Process

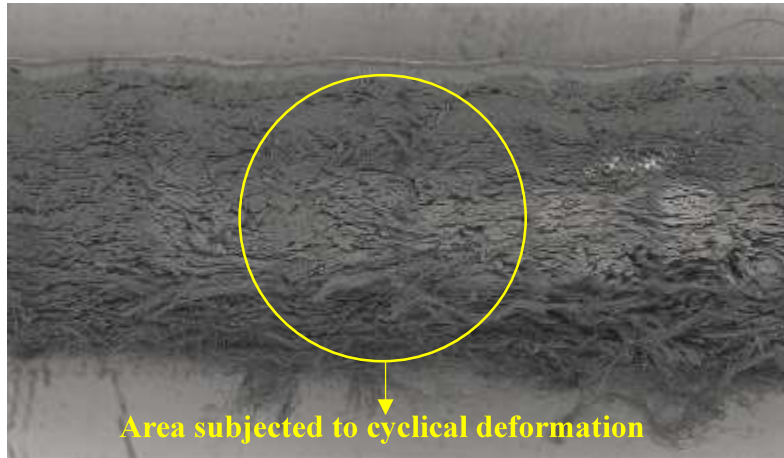


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Scanning Electron Microscopy (SEM) imaging shows that every individual nylon fiber of the substrate is coated with Bio-Alloy®, forming a new composite material (Figure 4). [REDACTED], it is expected that the Bio-Alloy® is well-adhered to the surface of the nylon fibers. This is evidenced by SEM analysis of post-tanned VERA, where the composite structure is intact and holds up through the vigorous post-tanning process. Furthermore, SEM analysis of finished VERA tested on Bally Flex shows that the material structure holds up to cyclical deformation, with no signs of delamination of the Bio-Alloy® (Figure 5).

Figure 4. Scanning electron microscopy (SEM) of [REDACTED] VERA (top and bottom right).



*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor**Figure 5. Finished VERA after 100k Bally Flex Cycles.**Table 1. Physical Properties of VERA*

Property	Unit		Test Standard	VERA
Thickness	mm		ISO-2589	1.2
GSM	g/m ²		SATRA TM28	637
Softness	-		ISO-17235	3.3
Burst Strength	N		SATRA TM24	605
Tear Strength	Machine	N	ISO-3377	49
	Cross			64
Tensile Young's Modulus	Machine	MPa	ISO-3376	48
	Cross			15
Tensile Strength at Break	Machine	MPa	ISO-3376	25
	Cross			25
Tensile Strain at Break	Machine	MPa	ISO-3376	69
	Cross			105
Strain - 25N	Machine	%	ISO-3376	6.5
	Cross			13
Strain - 50N	Machine	%	ISO-3376	11

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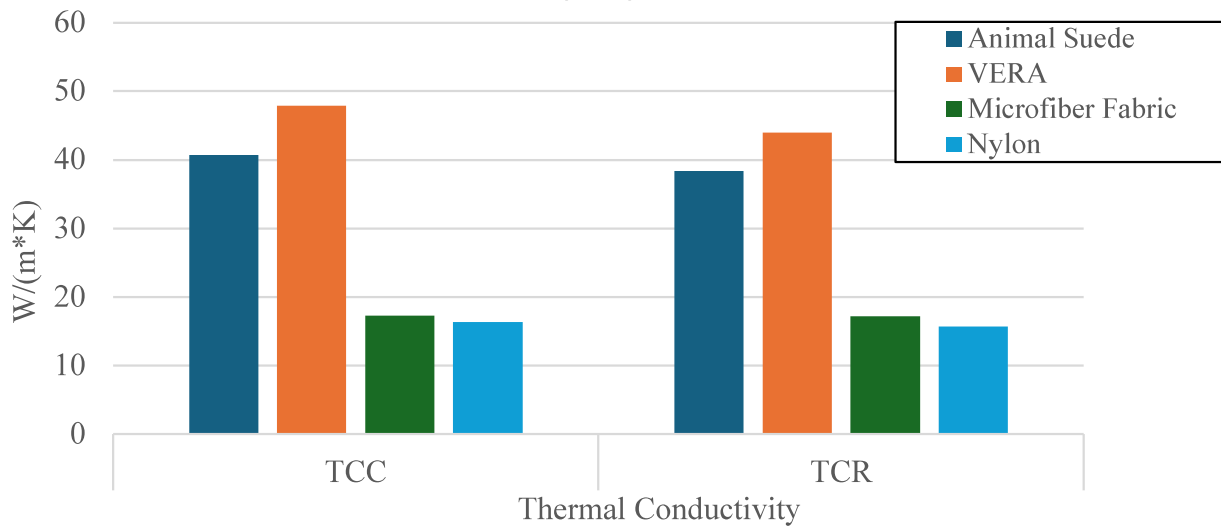
	<i>Cross</i>			21
Strain - 100N	<i>Machine</i>	%	ISO-3376	18
	<i>Cross</i>			35
Tensile Hysteresis Permanent Set	<i>Machine</i>	%	15% strain for 5 cycles	5.5
	<i>Cross</i>			4.5

These performance metrics of VERA demonstrate the sophisticated engineering of the material and its unique composition, that gives it long lasting durable performance characteristics, while possessing the same appearance and feel of animal leather.

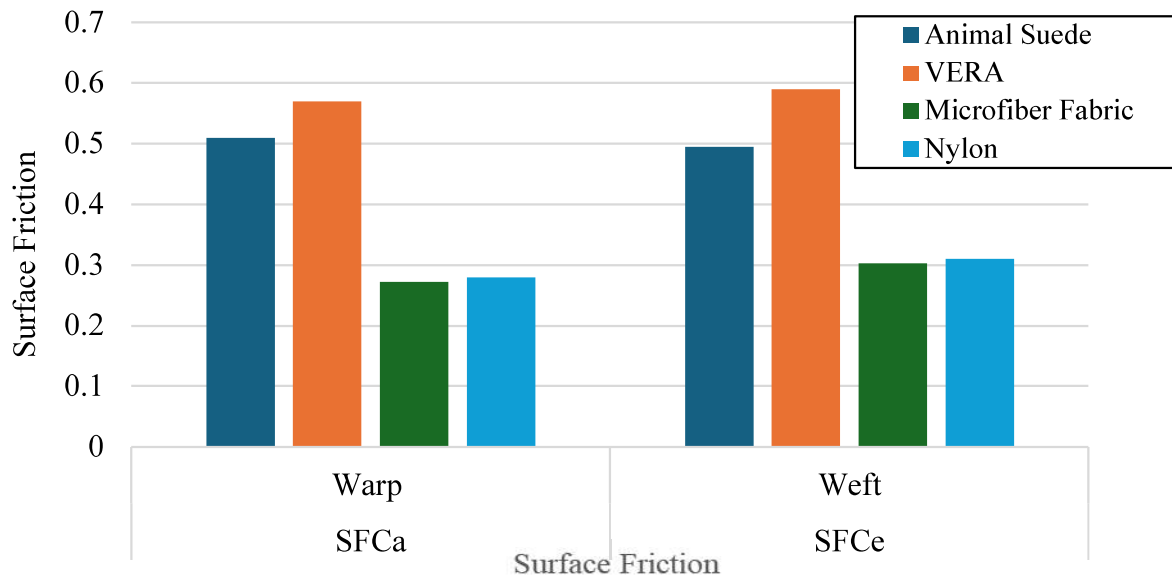
Also, note that the additional protein reactive groups in its composition contribute to VERA having improved dyeability compared to synthetic textiles such as Nylon, and animal leather.

Figure 6. Thermal conductivity measured by FTT.

Thermal Conductivity and Surface Friction by FTT Comparison of VERA nylon, animal suede, and microfiber fabric.



VERA exhibits higher thermal conductivity values, and correspondingly, a 'warmer' feel that more closely resembles the warmth of animal leather suede. In contrast, nylon shows lower thermal conductivity and a 'cooler' touch, consistent with typical microfiber fabrics.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor**Figure 7. Surface Friction measured by FTT.*

VERA exhibits higher surface friction values that more closely resembles the surface friction of animal suede. In contrast, nylon shows lower surface friction that is consistent with microfiber fabrics.

2.0 Proposed Generic Name and Definition

Based upon the information presented here, we ask that the Commission adopt the following new generic name and definition for VERA fiber under 16 CFR §303.7:

VERA: A manufactured textile composed of a [REDACTED] Nylon-6 substrate, infused with a plant protein-polyurethane alloy that contains chemical functional groups—including carboxyl, hydroxyl, sulfhydryl, amino, urethane, and disulfide groups—that strongly adhere to the amide linkages present in the Nylon [REDACTED].

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3.0 Discussion

The Textile Fiber Products Identification Act ("TFPIA"), 15 USC §§70 ~70k, requires marketers to attach a label to each covered textile product disclosing the generic names and percentages by weight of the constituent fibers in the product.

When the content is disclosed, it is required to be disclosed per procedure defined by under TFPLA and is a clear non-deceptive manner. Owing to the lack of a generic name currently available to suitably define VERA as a textile material, this application for a new generic name is of vital importance, to allow proper labeling of products manufactured with VERA fabric.

VERA is a unique textile material that is made from their proprietary system for combining select proteins with biobased polymers. This application for a new generic name is appropriate in order to permit proper labeling of products subject to the TFPIA manufactured from fabric containing at least five (5) percent of VERA.

3.1 Procedure for establishing Generic Name

Per 61 FR 16385. In 1973 the Commission summarized its policy for adopting generic fiber names, as follows:

[T]he Commission, in the interest of elucidating the grounds on which it has based this decision and shall base future decisions as to the grant of generic names for textile fibers, sets out the following criteria for grant of such generic names.

a. The fiber for which a generic name is requested must have a chemical composition radically different from other fibers, and that distinctive chemical composition must result in distinctive physical properties of significance to the general public.

Qualification- In section 3.2, we have described how VERA is radically different from all existing generic fibers. It doesn't in any manner have similar characteristics to any existing generic polymer in use. If Nylon is argued to be similar, since VERA used a Nylon substrate in its composition, you will find scientific data in appendix clearly showing VERA being drastically different than Nylon in its appearance, physical characteristics, physical properties, and most importantly the end-use physical attributes.

b. The fiber must be in active commercial use, or such use must be immediately foreseen.

Qualification- VERA is already commercially available, and has received positive acceptance in the industry, ranging from automotive brands, to furniture, to footwear and handbags. It will also be commercially available for use in clothing and accessories.

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c. The grant of the generic name must be of importance to the consuming public at large, rather than to a small group of knowledgeable professionals such as purchasing officers for large Government agencies.

Qualification- VERA is a unique textile material, and no similar material currently exists in the consumer product market. It is offered as a environment conscious alternative to animal leather. Granting it a unique generic name will allow the general consuming public at large to recognize it and clearly understand that it is not leather from animals, but an engineered alternative that satisfies their need for a leather looking product.

The use of water, GHG emission and fossil fuel consumption are all significantly lower than traditional production, showing the positive environmental impact of VERA.

Leather will be continued to be used as consumers desire products with the appearance and feel of leather. VERA offers a reliable sustainable alternative to leather, offering the same appearance and feel as traditional animal leather.

3.2 Leather alternatives

In a paper published in the National Library of Medicine, the need for vegan leather and the alternative use of gel-based materials derived from natural and polymer materials was discussed. Below is an extract from the paper.

“Increased global awareness of environmental sustainability and ethical consumerism has amplified the demand for sustainable alternatives to animal-derived leather. Traditional leather manufacturing faces significant ethical and ecological challenges, including greenhouse gas emissions, excessive water consumption, deforestation, and toxic chemical usage. Vegan leather has emerged as a promising solution, predominantly fabricated from petroleum-based synthetic materials such as polyurethane (PU) and polyvinyl chloride (PVC). However, these materials have sustainability limitations due to their non-biodegradability and associated environmental burdens. To overcome these issues, this paper critically explores the feasibility of developing vegan leather using gel-based materials derived from natural and synthetic polymers. These materials offer precise structural controllability, excellent biodegradability, and the potential for significantly improved mechanical performance through hybridization and nanocomposite strategies.”

3.3 VERA Is Not Sufficiently Similar To, And Cannot Be Identified By Any Existing Generic Name

(a) *Acrylic*

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85 percent by weight of acrylonitrile units.

VERA is not comprised of at least 85 percent by weight of acrylonitrile units, and therefore, does not meet the FTC definition of Acrylic.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor***(b) Modacrylic**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of less than 85 percent but at least 35 percent by weight of acrylonitrile units.

VERA is not comprised of less than 85 percent but at least 35 percent by weight of acrylonitrile units, and therefore, does not meet the FTC definition of Modacrylic.

(c) Polyester

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of a substituted aromatic carboxylic acid, including but not restricted to substituted terephthalate units, and para substituted hydroxy-benzoate units.

VERA is not composed of at least 85 percent by weight of an ester of a substituted aromatic carboxylic acid, including substituted terephthalate units and para substituted hydroxy-benzoate units. VERA does not contain ester groups as the dominant functional unit or is derived from glycol containing of at least ninety mole percent 1,3-propandiol, but rather, contains an [REDACTED] polyurethane characterized by urethane linkages formed from diisocyanates with polyols.

(d) Rayon

A manufactured fiber composed of regenerated cellulose, as well as manufactured fibers composed of regenerated cellulose in which substituents have replaced not more than 15% of the hydrogens of the hydroxyl groups. Where the fiber is composed of cellulose precipitated from an organic solution in which no substitution of the hydroxyl groups takes place and no chemical intermediates are formed, the term lyocell may be used as a generic description of the fiber.

VERA is not composed of regenerated cellulose, and therefore, does not meet the FTC definition of Rayon.

(e) Acetate

A manufactured fiber in which the fiber-forming substance is cellulose acetate. Where not less than 92 percent of the hydroxyl groups are acetylated, the term triacetate may be used as a generic description of the fiber.

VERA is not a cellulose acetate, and therefore, does not meet the FTC definition of Acetate.

(f) Saran

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 80 percent by weight of vinylidene chloride units (-CH₂-CCl₂-).

VERA is not composed of at least 80 percent by weight of vinylidene chloride units, and therefore, does not meet the FTC definition of Rayon.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor***(g) Azlon**

A manufactured fiber in which the fiber-forming substance is composed of any regenerated naturally occurring proteins.

VERA is not composed fully of a regenerated naturally occurring protein. It has a polymer core, infused with a bio-polymer and plant-based protein alloy, and therefore, does not meet the FTC definition of Rayon.

(h) Nylril

A manufactured fiber containing at least 85 percent of a long chain polymer of vinylidene dinitrile ($-\text{CH}_2-\text{C}(\text{CN})_2-$) where the vinylidene dinitrile content is no less than every other unit in the polymer chain.

VERA does not contain at least 85 percent of a long chain polymer of vinylidene dinitrile, and therefore, does not meet the FTC definition of Rayon.

(i) Nylon

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polyamide in which less than 85 percent of the amide linkages are attached directly to two aromatic rings.

Although VERA contains a nylon core, it is fully enveloped within and strongly adhered to a plant protein-polyurethane miscible blend coating. The plant protein-polyurethane coating provides additional linkages and chemical functional groups not inherent to nylon such as disulfide, carboxyl, hydroxyl, sulfhydryl, amine groups, and urethane linkages that extend the capabilities and usability of nylon. Therefore, FTC's definition of nylon does not fully capture the performance and usability of VERA. Additional substantiation and explanation is provided in Appendix 5.1.

(j) Rubber

A manufactured fiber in which the fiber-forming substance is comprised of natural or synthetic rubber, including the following categories:

(1) a hydrocarbon such as natural rubber, polyisoprene, polybutadiene, copolymers of dienes and hydrocarbons, or amorphous (noncrystalline) polyolefins; or

(2) a copolymer of acrylonitrile and a diene (such as butadiene) composed of not more than 50 percent but at least 10 percent by weight of acrylonitrile units; or

(3) A manufactured fiber in which the fiber-forming substance is a polychloroprene or a copolymer of chloroprene in which at least 35 percent by weight of the fiber-forming substance is composed of chloroprene units.

VERA is not comprised of natural rubber, polyisoprene, polybutadiene, copolymers of dienes and hydrocarbons, or amorphous polyolefins. It is also not a copolymer of acrylonitrile and diene, polychloroprene or a copolymer of chloroprene and therefore does not meet the FTC definition of Rubber.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor***(k) Spandex**

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polymer comprised of at least 85 percent of a segmented polyurethane.

VERA is not comprised of at least 85 percent of segmented polyurethane and therefore does not meet the FTC definition of Spandex.

(l) Vinal

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50 percent by weight of vinyl alcohol units (-CH₂-CHOH-), and in which the total of the vinyl alcohol units and any one or more of the various acetal units is at least 85 percent by weight of the fiber.

VERA does not contain vinyl alcohol units and therefore does not meet the FTC definition of Vinal.

(m) Olefin

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85 percent by weight of ethylene, propylene, or other olefin units, except amorphous (noncrystalline) polyolefins. Where the fiber-forming substance is a cross-linked synthetic polymer, with low but significant crystallinity, composed of at least 95 percent by weight of ethylene and at least one other olefin unit, and the fiber is substantially elastic and heat resistant, the term *lastol* may be used as a generic description of the fiber.

VERA is not composed of regenerated cellulose, and therefore, does not meet the FTC definition of Olefin.

(n) Vinyon

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85 percent by weight of vinyl chloride units (-CH₂-CHCl-).

VERA is not composed of at least 85 percent by weight of vinyl chloride units, and therefore, does not meet the FTC definition of Vinyon.

(o) Metallic

A manufactured fiber composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal.

VERA is not composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal, and therefore, does not meet the FTC definition of Metallic.

(p) Glass

A manufactured fiber in which the fiber-forming substance is glass.

VERA is not glass, and therefore, does not meet the FTC definition of Glass.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor***(q) Anidex**

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50 percent by weight of one or more esters of a monohydric alcohol and acrylic acid, $\text{CH}_2=\text{CH}-\text{COOH}$.

VERA is not composed of one or more esters of a monohydric alcohol and acrylic acid, and therefore, does not meet the FTC definition of Anidex.

(r) Novoloid

A manufactured fiber containing at least 85 percent by weight of a cross-linked novolac.

VERA does not contain at least 85 percent by weight of a cross-linked novolac, and therefore, does not meet the FTC definition of Novoloid.

(s) Aramid

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polyamide in which at least 85 percent of the amide linkages are attached directly to two aromatic rings.

VERA is not a long-chain synthetic polyamide in which at least 85 percent of the amide linkages are attached directly to two aromatic rings and therefore does not meet the FTC definition of Aramid.

(t) Sulfar

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polysulfide in which at least 85% of the sulfide ($-\text{S}-$) linkages are attached directly to two (2) aromatic rings.

VERA is not a synthetic polysulfide, and therefore, does not meet the FTC definition of Sulfar.

(u) PBI

A manufactured fiber in which the fiber-forming substance is a long chain aromatic polymer having reoccurring imidazole groups as an integral part of the polymer chain.

VERA is not a long chain aromatic polymer having reoccurring imidazole groups as an integral part of the polymer chain, and therefore, does not meet the FTC definition of PBI.

(v) Elastoester

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polymer composed of at least 50% by weight of aliphatic polyether and at least 35% by weight of polyester.

VERA is not composed of regenerated cellulose, and therefore, does not meet the FTC definition of Elastoester.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor***(w) Melamine**

A manufactured fiber in which the fiber-forming substance is a synthetic polymer composed of at least 50% by weight of a cross-linked melamine polymer.

VERA is not composed of at least 50% by weight of a cross-linked melamine polymer, and therefore, does not meet the FTC definition of Melamine.

(x) Fluoropolymer

A manufactured fiber containing at least 95% of a long-chain polymer synthesized from aliphatic fluorocarbon monomers.

VERA does not contain a long-chain polymer synthesized from aliphatic fluorocarbon monomers, and therefore, does not meet the FTC definition of Fluoropolymer.

(y) PLA

A manufactured fiber in which the fiber-forming substance is composed of at least 85% by weight of lactic acid ester units derived from naturally occurring sugars.

VERA is not composed of lactic acid ester units derived from naturally occurring sugars, and therefore, does not meet the FTC definition of PLA.

4.0 Impact & Benefits

4.1 Patents

Modern Meadows has received three patents for their unique technology used in manufacturing VERA.

US 2021/0355326 A1- Issued by United States Patent for the synthesis of protein polyurethane alloys and layered materials including the same.

US 11,352,497 B2- Issued by United States Patent for the synthesis of layered collagen materials and methods of making the same

WO 2024/040172 A2- Issued by World Intellectual Property Organization for the synthesis of protein polyurethane alloy materials.

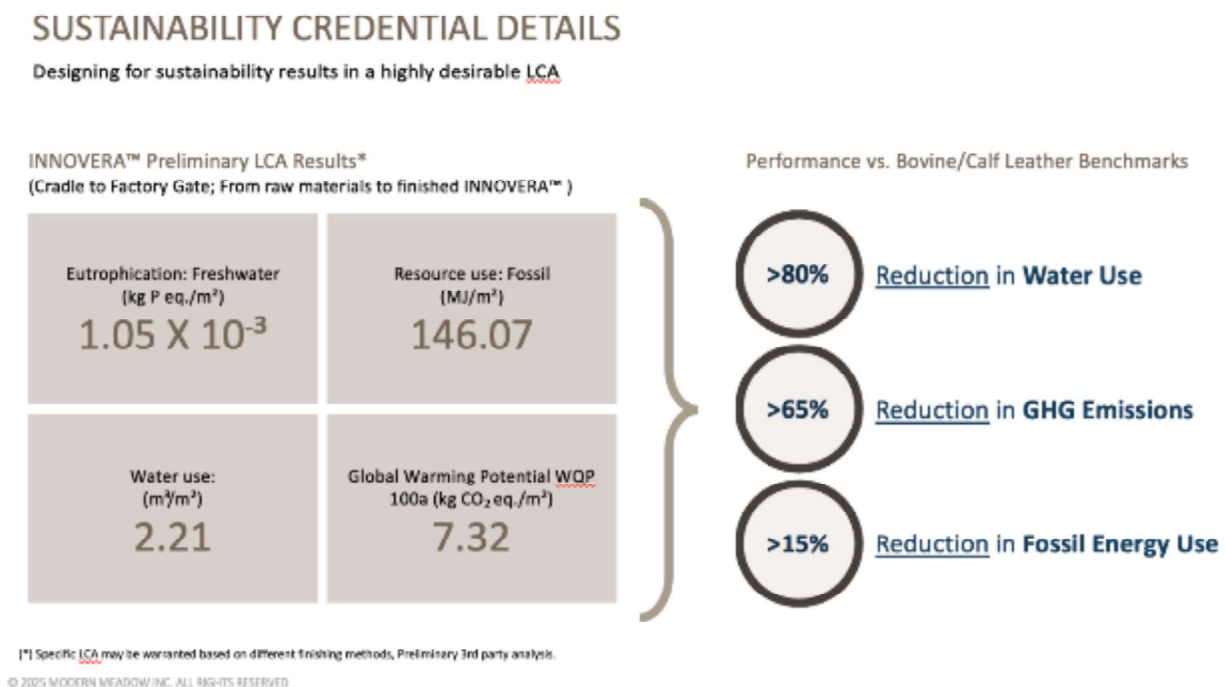
*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor*

4.2 Lifecycle assessment- VERA compared to traditional animal leather production

The use of water, GHG emission and fossil fuel consumption are all significantly lower than traditional production, showing the positive environmental impact of VERA.

Leather will continue to be used as long as consumers desire products with the appearance and feel of leather. VERA offers a reliable sustainable alternative to leather.

Figure 8. LCA results and comparison to Bovine leather



4.3 Recycling Plan

In collaboration with BASF and any other partners with similar chemical recycling capabilities, Modern Meadow is committed to implementing a depolymerization recycling processes for VERA technology. This plan aims to create a closed-loop system for polyamide 6 (PA6), ensuring that our materials can be recycled and reused efficiently, reducing waste and conserving resources.

Modern Meadow has scientific evidence that VERA can successfully be depolymerized for PA-6 recovery. To evaluate the technical feasibility of chemical recycling, Modern Meadows supplied 15 samples of VERA. Each sample was depolymerized using BASF's internal method, analyzed, and the amount of recoverable material was determined through a standardized quantitative process.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor*The Recycling Process

The Loopamid process works through the following steps:

- **Collection:** End-of-life Dry White/ VERA products are collected via take-back programs developed by the fashion brands. Those brands would have to partner with BASF and the existing network of waste collectors that would segregate the materials and ship to BASF's depolymerization plants in Europe.
- **Depolymerization:** The collected materials undergo a depolymerization process, breaking down the PA6 into its base components.
- **Purification:** The resulting materials are purified to remove contaminants.
- **Repolymerization:** The purified components are repolymerized to create new PA6.
- **Production:** Once commercially available, the recycled PA6 could be used as an input to create new Dry White/ VERA products.

This closed-loop system allows our materials to be continuously recycled, reducing the need for virgin resources and minimizing waste.

5.0 Appendix

5.1 VERA VS Nylon-6

VERA, while comprising a nylon textile as a constituent, exhibits distinctive properties that extend the functional capabilities of nylon through the combined effects of Bio-Alloy® and its composite structure.

Bio-Alloy® imparts distinct physical properties and functionalities not inherent to nylon, with reactive groups such as disulfide, carboxyl, hydroxyl, sulfhydryl, and amino groups, enabling the interaction with post-tanning chemistries, such as dyes, tanning agents, and fat liquors. Furthermore, the nylon [REDACTED] structure is engineered to mimic the structure of collagen fibers found in animal leather and is stabilized with Bio-Alloy® to provide, but not limited to, durability while maintaining desirable haptics after post-tanning.

Below data shows evidence to prove how VERA is significantly different from Nylon in physical properties, and its physical characteristics. VERA's superior strength, while maintaining superior softness, is a unique attribute that differentiates it from Nylon.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor**Table 2. VERA [REDACTED] Textile Performance Standards Comparison*

Property	Unit	Test Standard		VERA
Thickness	mm	ISO-2589		1.2
Softness	-	ISO-17235		3.3
Burst Strength	N	SATRA TM24		605
Tensile Young's Modulus	Machine	MPa	ISO-3376	48
	Cross			15
Strain - 25N	Machine	%	ISO-3376	6.5
	Cross			13
Strain - 50N	Machine	%	ISO-3376	11
	Cross			21
Strain - 100N	Machine	%	ISO-3376	18
	Cross			35
Tensile Hysteresis Permanent Set	Machine	%	15% strain for 5 cycles	5.5
	Cross			4.5

Table 3. Resistance Properties of [REDACTED] and VERA after abrasion testing TABER® Rotary Platform Abrasion Tester (1000g load of CS-1 Wheel Type) for 50 cycles.

Property	Unit	VERA
Mass Loss	%	0.003
Taber Wear Index (Rate of Wear)	-	0.006
Depth of Wear	mm	0.03
Thickness loss	%	1.8

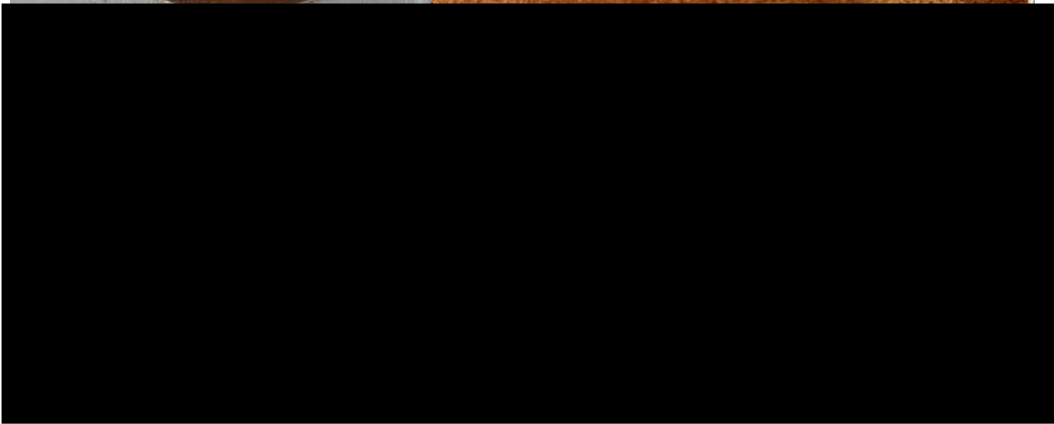
VERA show better Taber Abrasion resistance [REDACTED] as shown in Table 3.

Request for Designation of New Generic Fiber

Attn: Ms. April Tabor

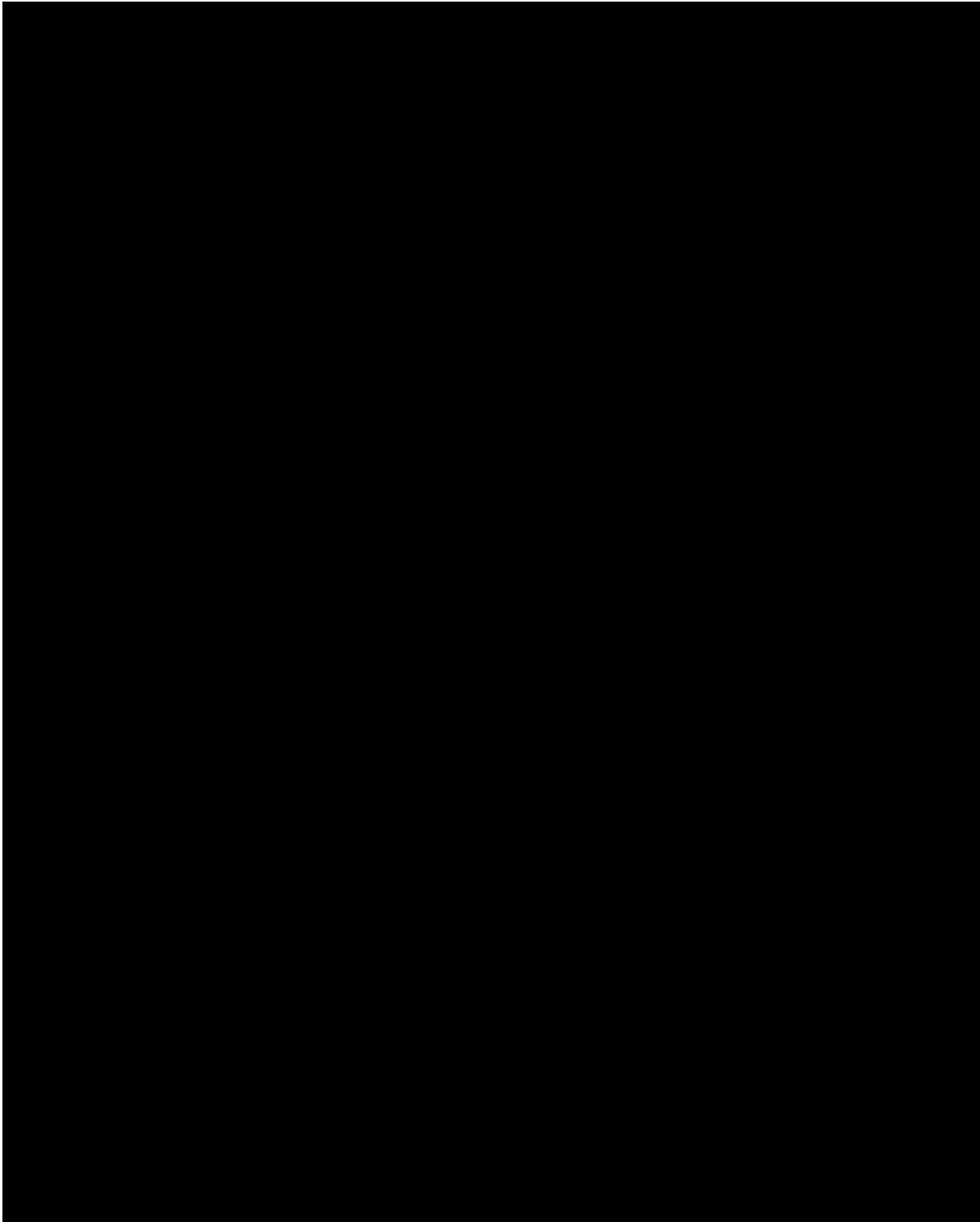


Figure 9. VERA (top left-right) [redacted] after 50 cycles abrasion on TABER® Rotary Platform Abrasion Tester (1000g load of CS-1 Wheel Type).



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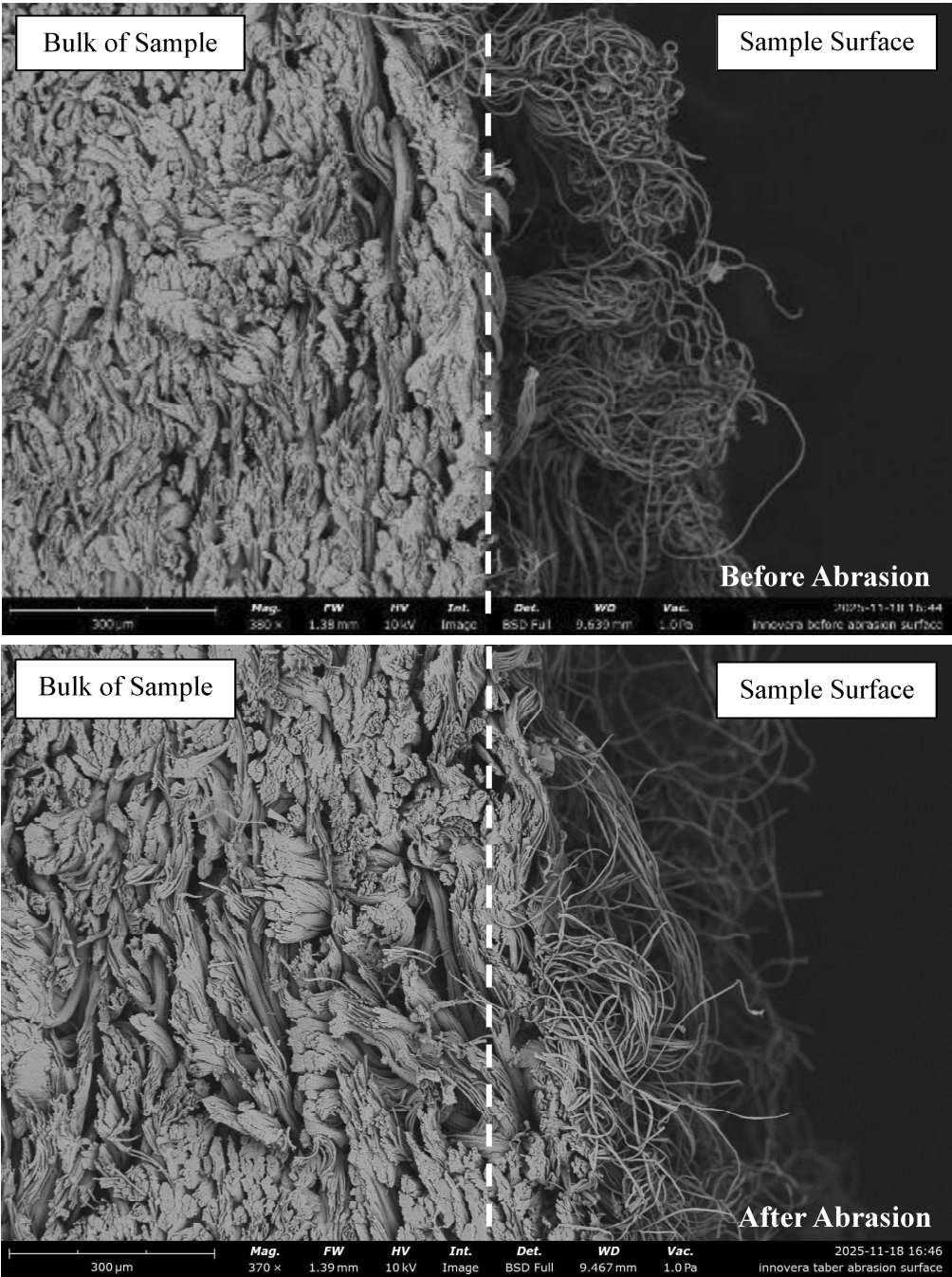


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Figure 11. SEM Cross-Section Image VERA before Taber Abrasion (top) and VERA after Taber Abrasion (bottom).



The structure of VERA seems to be better conserved after abrasion than the nylon.

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Figure 12. VERA (left) [redacted] after Dry Martindale Abrasion for 10k cycles.



VERA show better Dry Martindale abrasion Resistance [redacted]
[redacted]

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Table 4. Fabric Touch Tester (FTT) Properties

Fabric Property	Description	Index	Fabric Direction	Unit	VERA
Bending	Bending Average Rigidity	BARa	Warp	gf mm rad-1	1739
	Bending Average Rigidity	BARe	Weft		1633
	Bending Work	BWa	Warp	gf mm rad	6245
	Bending Work	BWe	Weft		6072
Surface Friction	Surface Friction Coefficient	SFCa	Warp	-	0.6
	Surface Friction Coefficient	SFCe	Weft	-	0.6
Surface Roughness	Surface Roughness Amplitude	SRAa	Warp	μm	52
	Surface Roughness Amplitude	SRAe	Weft		64
	Surface Roughness Wavelength	SRWa	Warp	mm	2.0
	Surface Roughness Wavelength	SRWe	Weft		2.6
Compression	Thickness Under Standard Pressure	T		mm	1.3

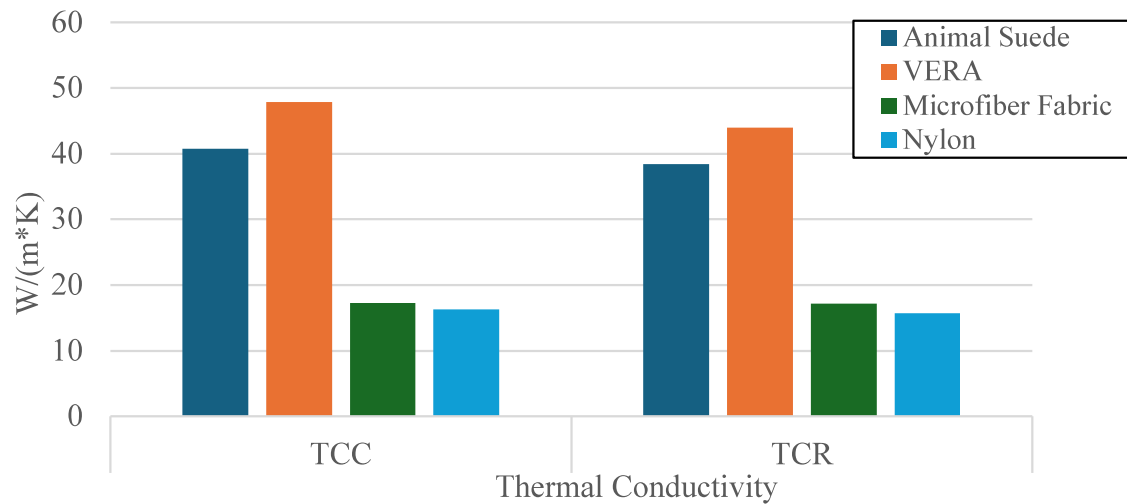
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	(ASTM D1777)			
	Compression Work	CW	gf mm	1225
	Compression Recovery Rate	CRR	-	0.3
	Compression Average Rigidity	CAR	gf mm-3	220
	Recovery Average Rigidity	RAR	gf mm-3	1327
Flux	Thermal Conductivity Under Compression	TCC	10-3 W m-1 °C-1	48
	Thermal conductivity Under Recovery	TCR	10-3 W m-1 °C-1	44
	Max Flux	Qmax	W mm-2	463

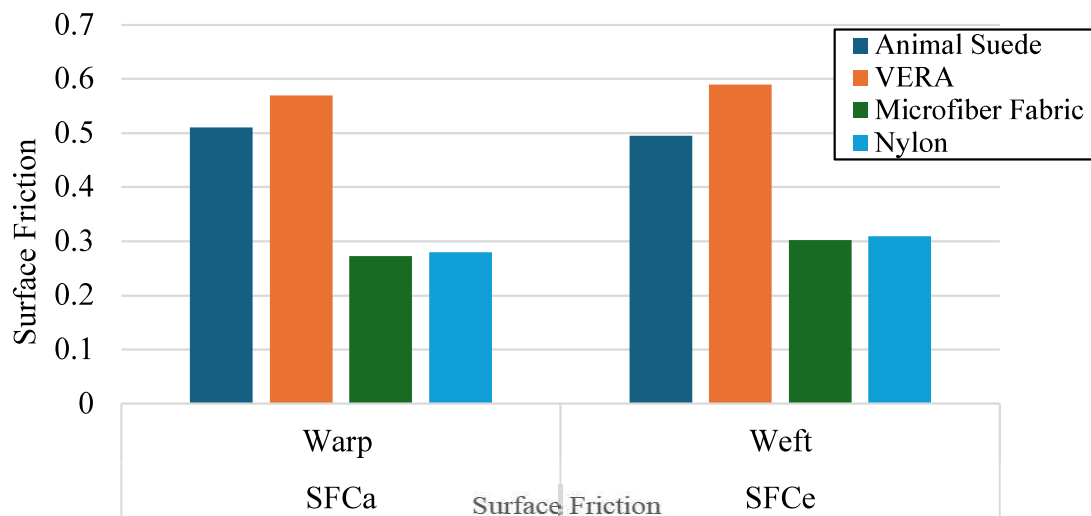
The Fabric Touch Tester (FTT) is an equipment that measures the mechanical and surface properties of a fabric (Table 4) to quantify the sensations felt when touching a fabric.

The bending average rigidity and bending work between the warp and weft direction are similar for VERA, suggesting that VERA is more isotropic

Vera is less compressible under standard pressure. This suggests that VERA is denser. This full-bodied dense cross-section is an attribute associated with leather and typically not found in synthetic polymers.

*Request for Designation of New Generic Fiber**Attn: Ms. April Tabor**Figure 13. Thermal conductivity measured by FTT.*

VERA exhibits higher thermal conductivity values, and correspondingly, a 'warmer' feel that more closely resembles the warmth of animal leather suede. In contrast, nylon shows lower thermal conductivity and a 'cooler' touch, consistent with typical microfiber fabrics.

Figure 14. Surface Friction measured by FTT.

VERA exhibits higher surface friction values that more closely resembles the surface friction of animal suede. In contrast, nylon shows lower surface friction that is consistent with microfiber fabrics.

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**5.2 References**

Section 3.2	Paper- https://pmc.ncbi.nlm.nih.gov/articles/PMC12192133/ “Gel-Based Approaches to Vegan Leather: Opportunities and Challenges in Mimicking Leather Properties” Soon Mo Choi, Do Hyun Lee, Sun Mi Zo, Ankur Sood, Sung Soo Han
Figure 4	Imaged on Phenom ProX G6 Desktop Scanning Electron Microscope – 12 & 14 March 2025, at Modern Meadow
Figure 5	Tested on SATRA STM701 Bally Flexometer and Imaged on Phenom ProX G6 Desktop Scanning Electron Microscope at Modern Meadow
Figure 6,7,13 & 14	Tested on SDL Atlas M293 Fabric Touch Tester November 2024 and July 2025 at Modern Meadow
Figure 8	LCA results and comparison to Bovine leather, 3 rd party analysis performed for Modern Meadow
Figure 9	Tested on TABER® Rotary Platform Abrasion Tester (1000g load of CS-1 Wheel Type) referring ASTM D3389 – “Coated Fabrics Abrasion Resistance (Rotary Platform Abrader)” – 12 November 2025, Modern Meadow
Figure 10	Imaged on Phenom ProX G6 Desktop Scanning Electron Microscope – 18 November 2025, Modern Meadow
Figure 11	Imaged on Phenom ProX G6 Desktop Scanning Electron Microscope – 18 November 2025, Modern Meadow
Figure 12	Tested on James Heal TF210 Martindale Abrasion & Pilling Tester following SATRA TM31 – “Abrasion Resistance – Martindale Method” – 12 November 2025, Modern Meadow
Table 1 & 2	Thickness measured on Chicago Dial Indicator 60812-1RS following ISO-2589 on 20 January 2026 at Modern Meadow, Softness tested on MSA Engineering Systems Limited ST300 following ISO-17235 on 20 January 2026 at Modern Meadow, Burst strength tested on SATRA Lastometer STM463 following SATRA TM24 on 20 January 2026 at Modern Meadow, Tear strength tested on Instron 5696 Universal Testing System following ISO-3377 on 20 January 2026 at Modern Meadow, Tensile Young’s Modulus, Strength at Break, Strain at Break, Strain – 25N, Strain – 50N, Strain – 100N tested on Instron 5696 Universal Testing System following ISO-3376 on 24 October 2025 at Modern Meadow, Tensile Hysteresis Permanent Set tested on Instron 5696 Universal Testing System on 18 November 2025 at Modern Meadow
Table 3	Tested on TABER® Rotary Platform Abrasion Tester (1000g load of CS-1 Wheel Type) referring ASTM D3389 – “Coated Fabrics Abrasion Resistance (Rotary Platform Abrader)” – 12 November 2025, Modern Meadow
Table 4	Tested on SDL Atlas M293 Fabric Touch Tester, November 2024 and July 2025 at Modern Meadow