Acteev®
MED

What is Acteev® MED?

Innovative

Polymerized Zinc ions in polyamide backbone. Premium antimicrobial performance without adding any manufacturing complexity. Cost effective and scalable.

Winner of multiple Innovation Awards and protected by more than 100 patents globally.

Antimicrobial

Active zinc ions protect from bacteria and fungi and prevents the formation of biofilm.

Dermatologically tested

Zinc oxide is a natural ingredient known to soothe the skin. Acteev fabric has been dermatologically tested and found to be non-irritating and non sensitizer.

Permanent

Protected with zinc ion technology embedded directly into the matrix of polyamide to provide permanency, unlike some topical treatments.

High performance

Nylon 6,6 is built to last, high tensile strength, breathable, moisture wicking and abrasion resistant.

Ascend Performance Materials

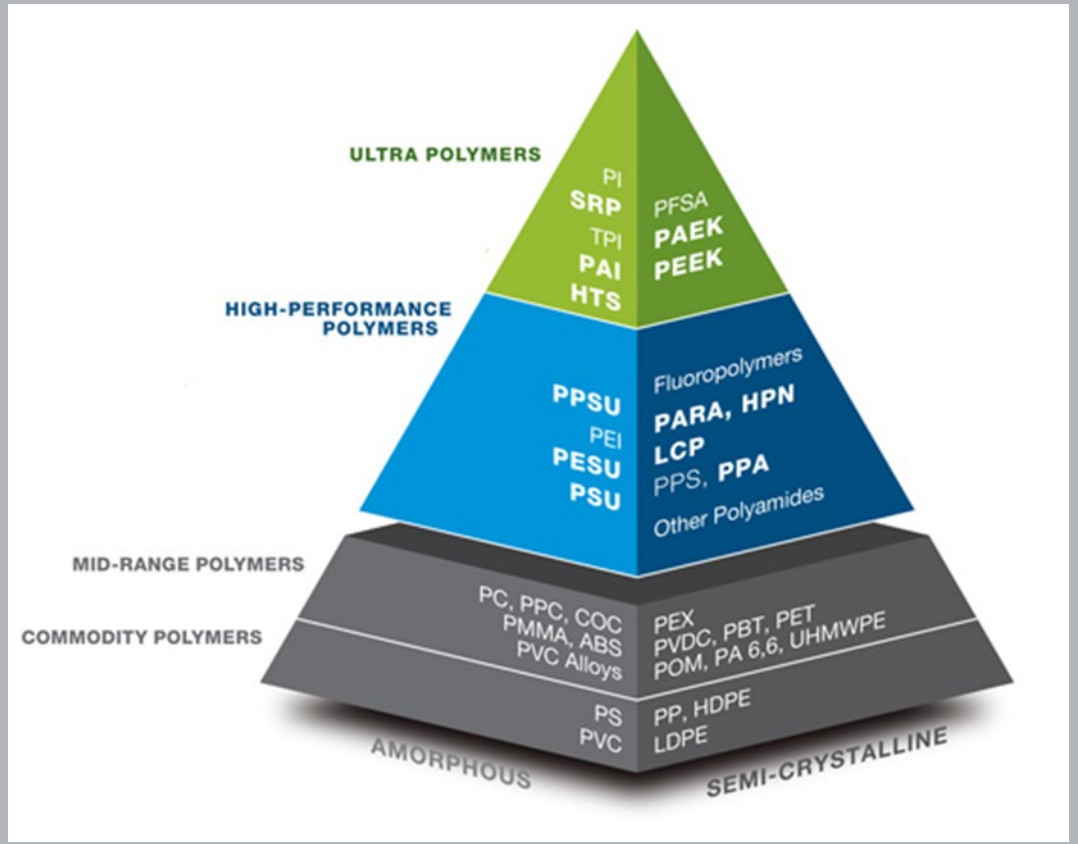
- 70-year history in revolutionizing safety in everyday products
- World's largest fully integrated polyamide 6,6 resin manufacturer
- Currently generate $3 B in annual revenue
- Pioneering path for new standards in bacteria and microbe-fighting technologies
- Inventor of Acteev zinc-based technology covered by more than 100 patents worldwide.

Ascend – Materials Solution using Nylon Technologies

Acteev MED

Nylons are a diverse set of materials with same basics of synthesis and hydrogen bonding.

- Nylons are versatile materials with the ability to easily tune properties from molecular level to tackle challenges in medical device.
- Nylons have good mechanical properties in terms of strength, modulus, toughness, and low density compared to other polymer family, which eventually could be translated into superior performance on-demand desired by medical devices.
- Thermal resistance, chemical resistance, and many others superior properties made it materials of choice for high-end military and automotive applications.
- Hydrogen bonding, polymerization capability in molten and solid state to incorporate various segment, and ability to control crystallinity drives a rich diversity within polyamide families.



What is Acteev?

Acteev® creates life-changing technologies. As a raw material supplier, combine the natural microbe-deactivating active zinc ions with our expertise in polyamides like nylon 6, 6 to revolutionize daily life.

Backed by decades of science from Ascend Performance Materials, Acteev weaves environmentally safe fighting power into the material of everyday life with everything.

Supported by Top Researchers

Acteev MED

Our Acteev medical advisory board brings together internationally recognized experts in the fields of PPE evaluation, viral pathology, epidemiology and infectious diseases. The board provides scientific review and advice on end applications of Acteev technology.

Raina MacIntyre, Ph.D.

Head of Biosecurity Programs, UNSW Sidney Kirby Institute

Christopher McDevitt, Ph.D.

Principal Investigator in Microbiology and Immunology, University of Melbourne

A.J. te Velthuis, Ph.D.

Assistant Professor at Princeton University, Department of Molecular Biology.

Karoll J. Cortez, M.D., M.H.S., F.A.C.P.

Infectious Disease Physician, Greater Baltimore Medical Center

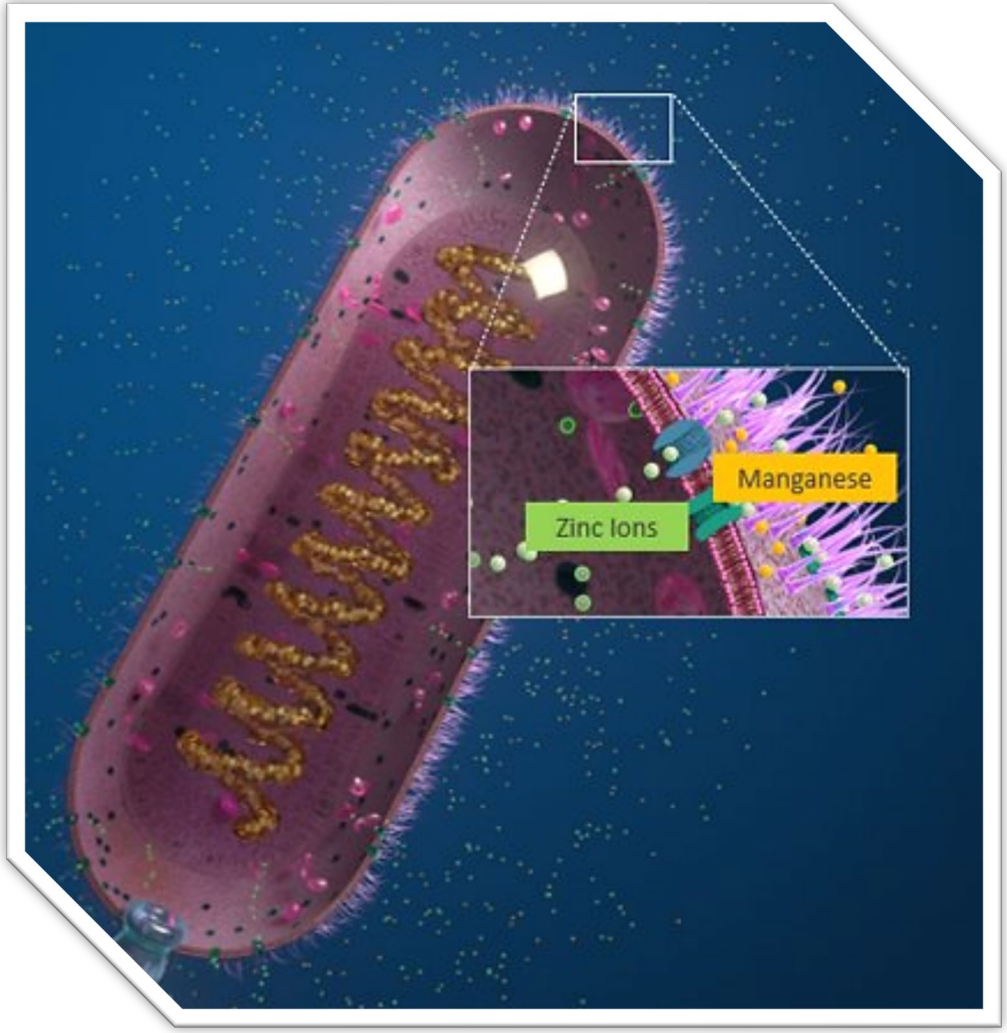
Tom Harmantas, M.D., F.R.C.S.C.

General Surgery, University of Toronto

Antimicrobial Technology

The mechanism of zinc

- As living beings, bacteria rely on nutrients to stay alive. However, when they come into contact with active zinc ions, their ability to process these vital nutrients is hindered. This leads the bacteria to ultimately ‘starve’ due to a lack of sustenance.
- Highly effective by inhibiting the growth of several strains of bacteria, including Staphylococcus aureus, Klebsiella pneumoniae, Escherichia coli, Candida auris and Candida albicans.
- The protection afforded by zinc is both non-cytotoxic and permanent.
- Zinc's impressive resistance to bacterial adaptation means zinc hasn’t shown any signs of bacteria resistance unlike other antimicrobial products.



Backed by science – Bacteria and Fungus

Independent laboratories have tested Acteev technology against common bacterial and fungal strains.

Microbe	Test Method
Staphylococcus aureus	ISO 20743
Klebsiella pneumoniae	ISO 20743
Escherichia coli	ASTM E3160
Candida auris	ASTM E3160
Candida albicans	ASTM E3160
Aspergillus brasiliensis Penicillium funiculosum Chaetomium globosum Trichoderma virens Aureobasidium pullulans	ASTM G21

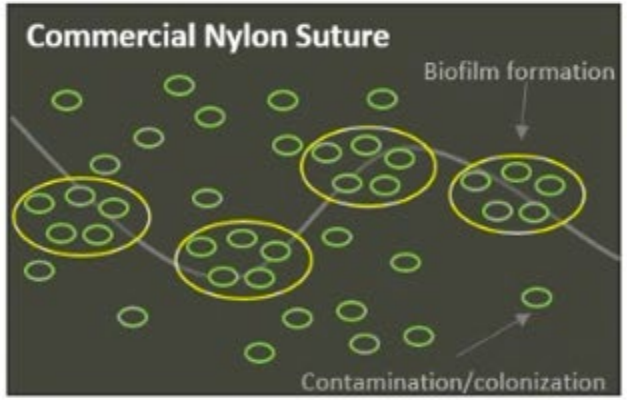
***Acteev's antimicrobial technology is embedded to protect the product. The product does not protect users or others against disease-causing bacteria, viruses, germs or other organisms.** Bioefficacy data (including antibacterial and antifungal) cannot be used on marketing materials, packaging or digital content in association with Acteev Protect even when referencing Acteev Technology. Regulations in other countries may differ. This presentation is for discussion purposes only. Consumer-facing literature and claims need to follow the appropriate regulatory and legal validation and review process.*

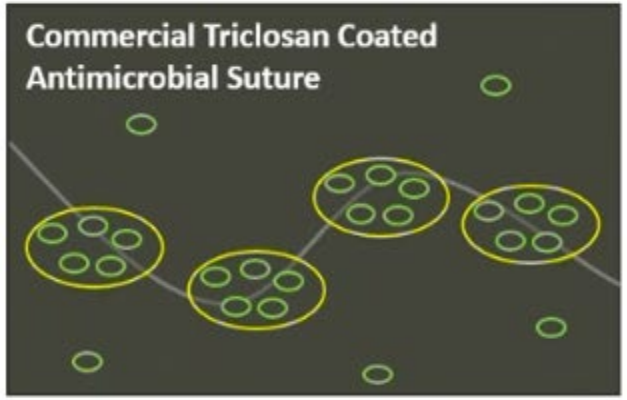
Testing conducted on various end forms. Please refer to technical data sheet for data on specific products.

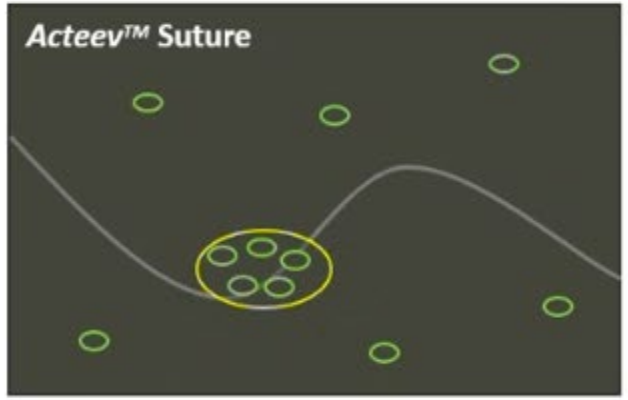
[1] Testing conducted on Acteev Protect fabric made with 70 denier/68 filament yarn and filaments.

Biofilm Prevention – Fiber Material

- *Localized surgical site infections (SSIs) are the most common postoperative complications with estimated to occur in 5% of all procedures (~1million SSIs in US every year)*
- *67% of all SSIs are confined to the incision and thus infection control on Suture is important*
- *Suture made with Acteev™ Technology not only controls the bacterial growth, but it also* ***reduces the biofilm formation up to 50%*** *while compared against leading commercial antimicrobial Suture and tested as per ASTM E3151*
- *Acteev is nylon polymerized with zinc ion requires* ***no additional process*** *for antimicrobial performance*

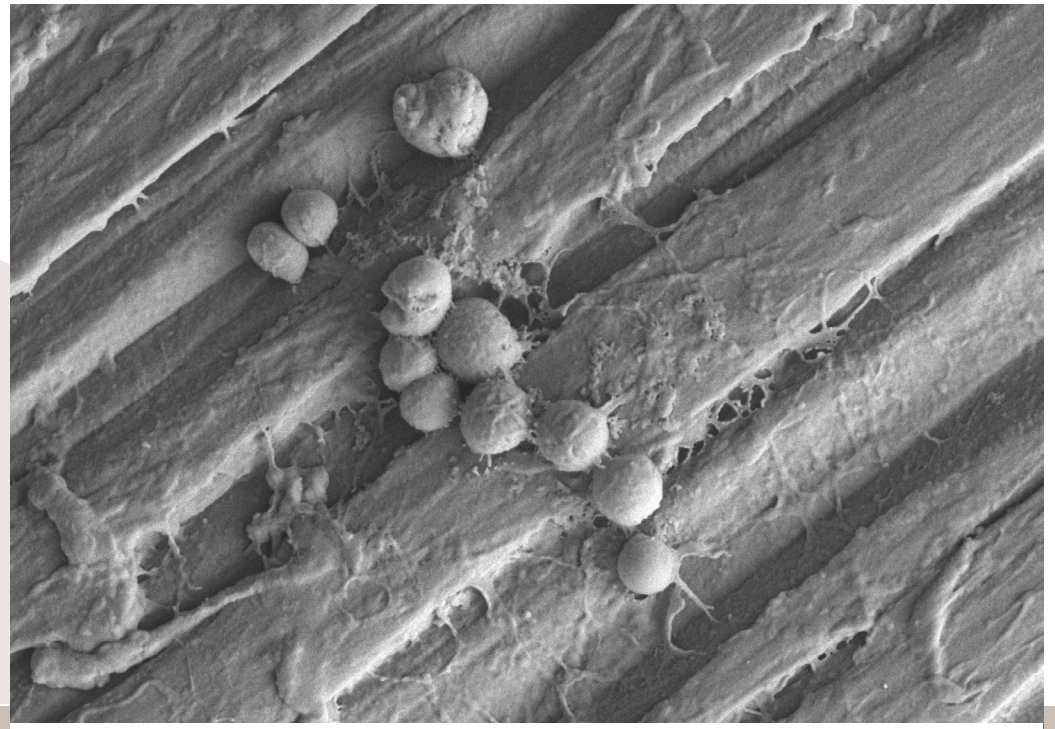




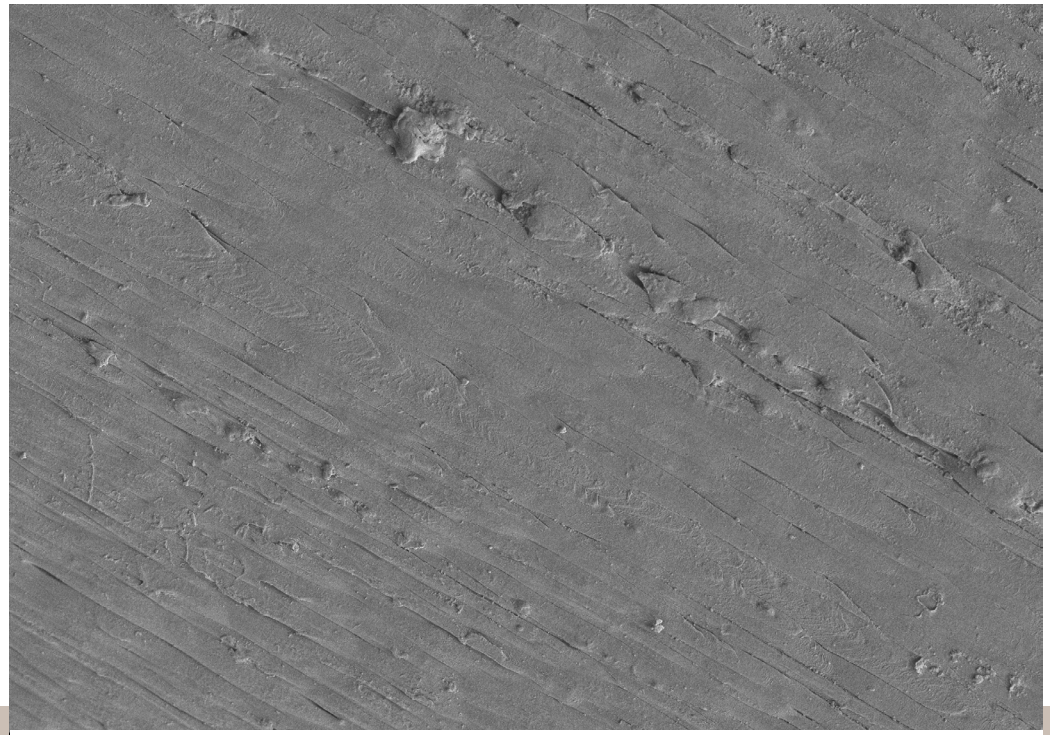


SEM Pictures of Biofilm

Acteev prevents the formation of biofilm by controlling the bioburden and reducing the bacteria adherence to the surface. ASTM E3151 protocol used to prepare the samples.



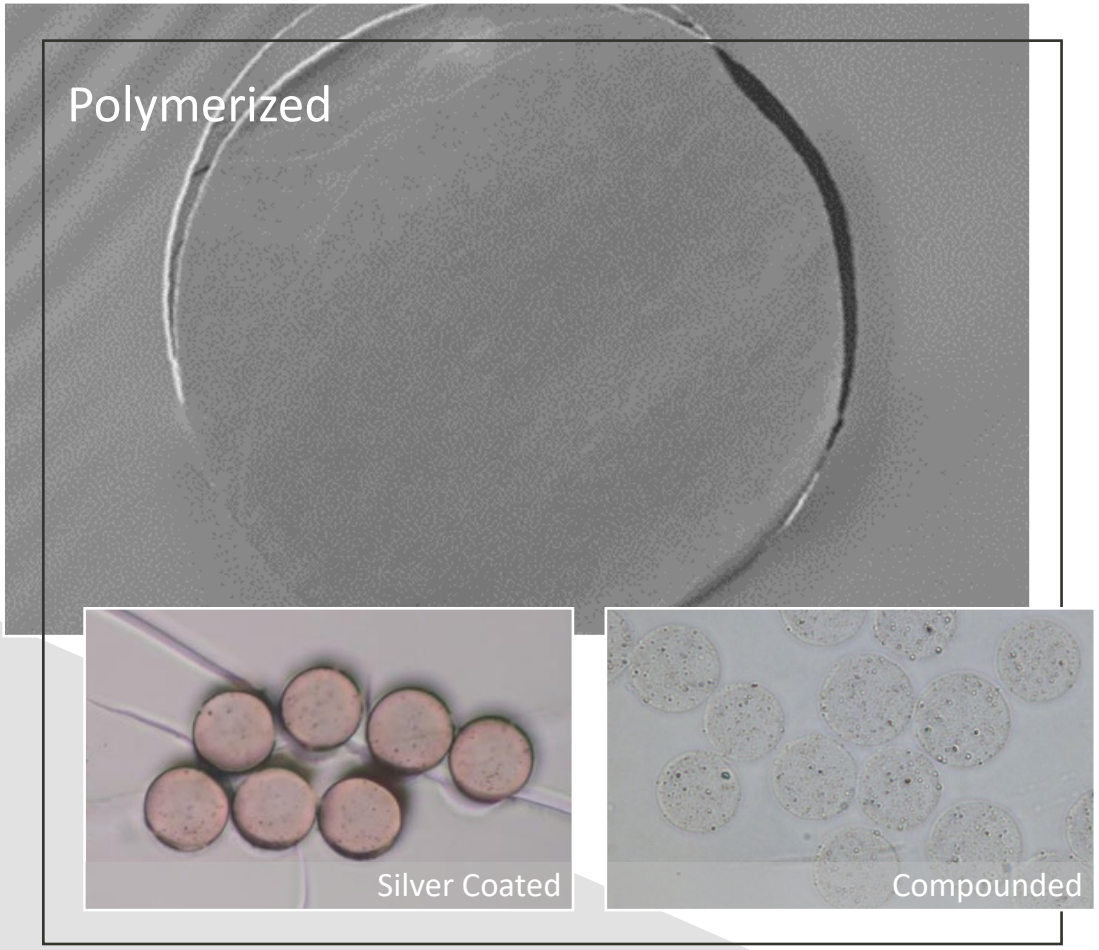
Commercial Nylon Suture (4-0)



Acteev Suture (Size 4-0)

Permanency & Strength

See the Difference



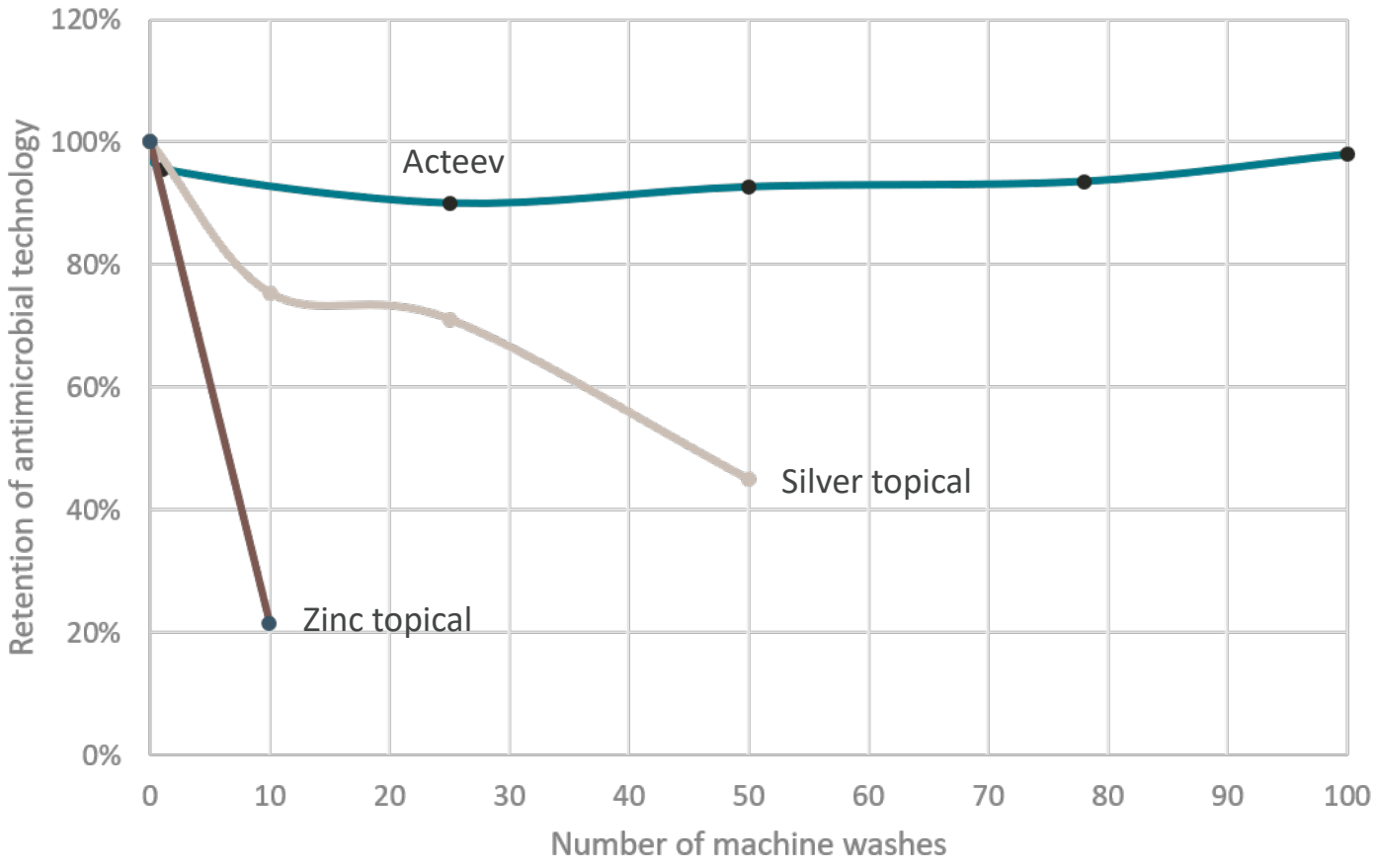
Acteev is not a compounded solution or a topical, it is imbedded with the polymer structure (molecular level)

- We control the complete process, molecule by molecule, to ensure quality, safety and security of supply.
- The active ingredients are added during the polymerization process, leaving them dispersed at the molecular level, distributed throughout the polymer matrix.
- The result is a high-durability antimicrobial polymer that can be dyed while keeping the most comfortable next to skin.

Permanent Protection

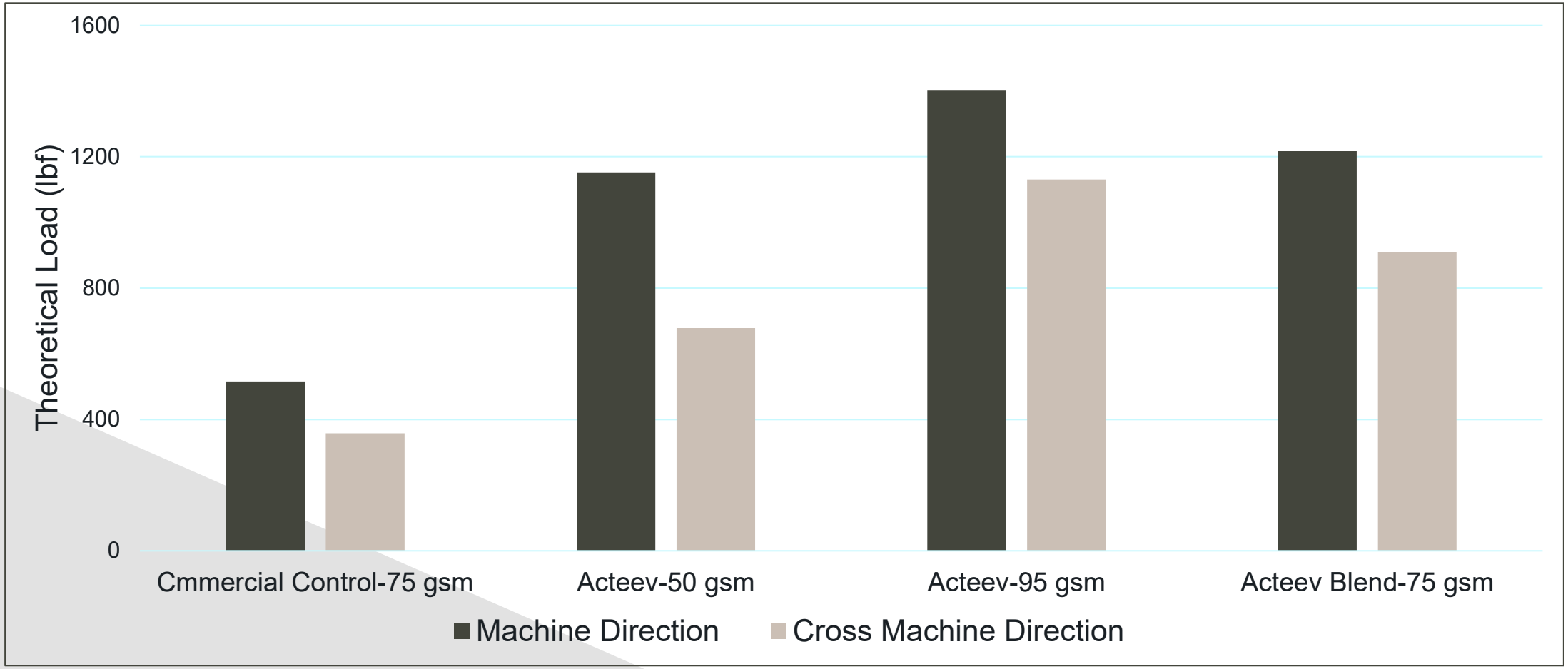
Determining efficacy

- Measure active ingredients of commercial samples and Acteev sample.
- Wash samples for a prescribed number of times per AATCC & LP01 protocol.
- Remeasure active ingredients to determine retention.



Material Strength

Static Ultimate Load Bearing capacity of fabric determines its applicability in high load bearing applications, such as patient positioning devices. These tests were performed at a third-party testing laboratory.



Sensitivity and Non-cytotoxic

Dermatologically Tested

Test Method:

- Three independent Repeat Insult Patch Test (RIPT) were conducted for the following Acteev materials: spun bound, natural knit, and natural knit/spandex blend.
- This procedure was repeated until a series of nine consecutive 24-hour exposures had been made three times a week for three consecutive weeks.
- Prior to each reapplication, the test sites were evaluated by trained laboratory personnel.

Results:

- 100% of subjects scored 0, which is negative or no reaction according to the international Contact Dermatitis Research Group scoring scale [1].
- Under the conditions of this study, there was no indication of potential to elicit dermal irritation or sensitization (contact allergy) noted.

[1] Rietschel, R.L, et.al. Fisher's Contact Dermatitis 4th ed. Baltimore, Williams & Wilkins, 1995

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Versatility of Value Chain and Collaboration Opportunity

Through our strategic partnerships in the value chain, we can provide a variety of form factors for your needs.

Acteev

- Non-cytotoxic
- Broad-spectrum antimicrobial
- Prevents the growth of biofilm
- Soothes irritated skin
- Superior moisture and pressure management
- Manufacturing flexibility

Current applications

Traditional Wound Care

Advanced Wound Care

Sutures

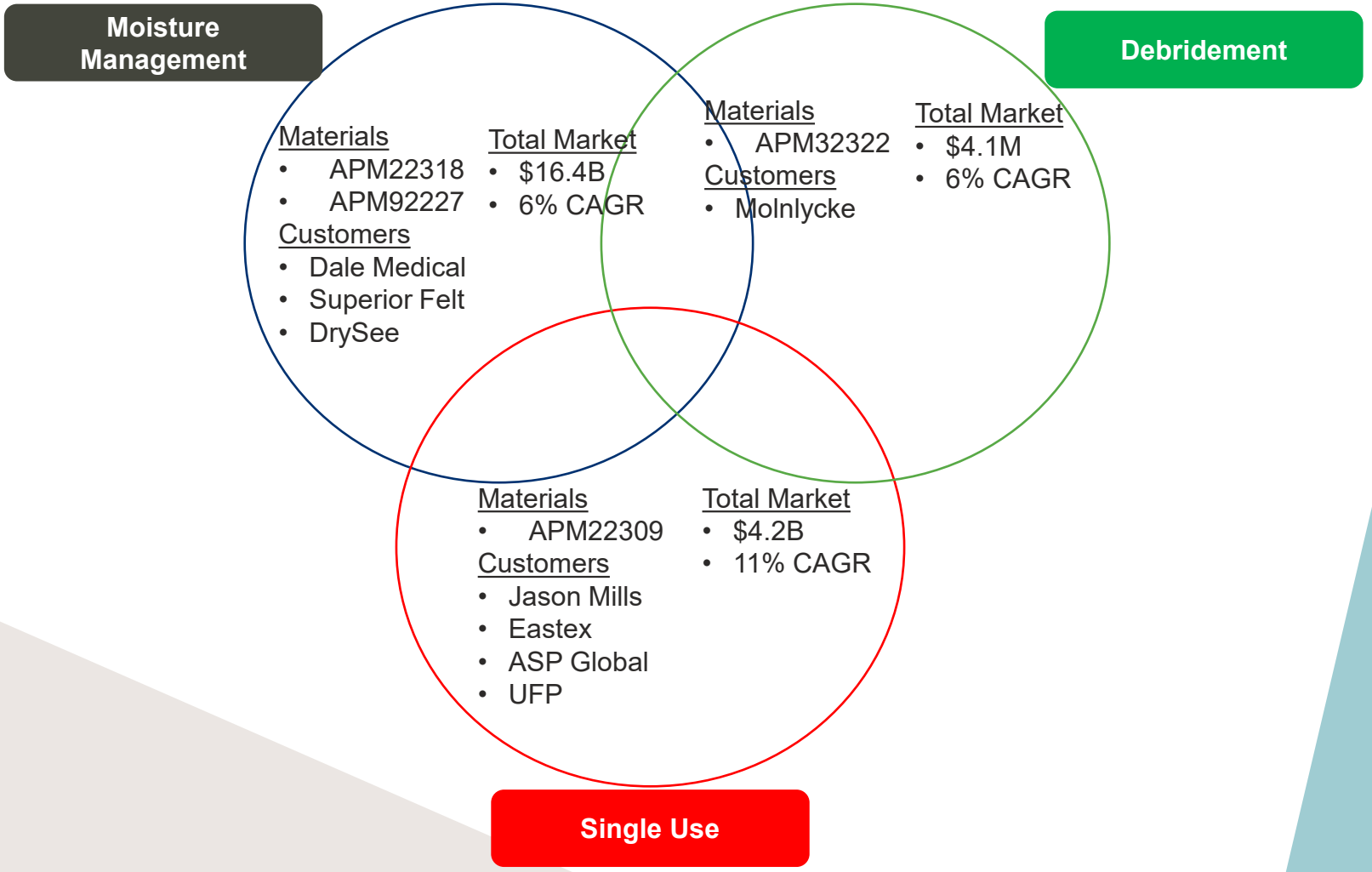
Compression/ Sports Braces

Patient Positioning


Questions?

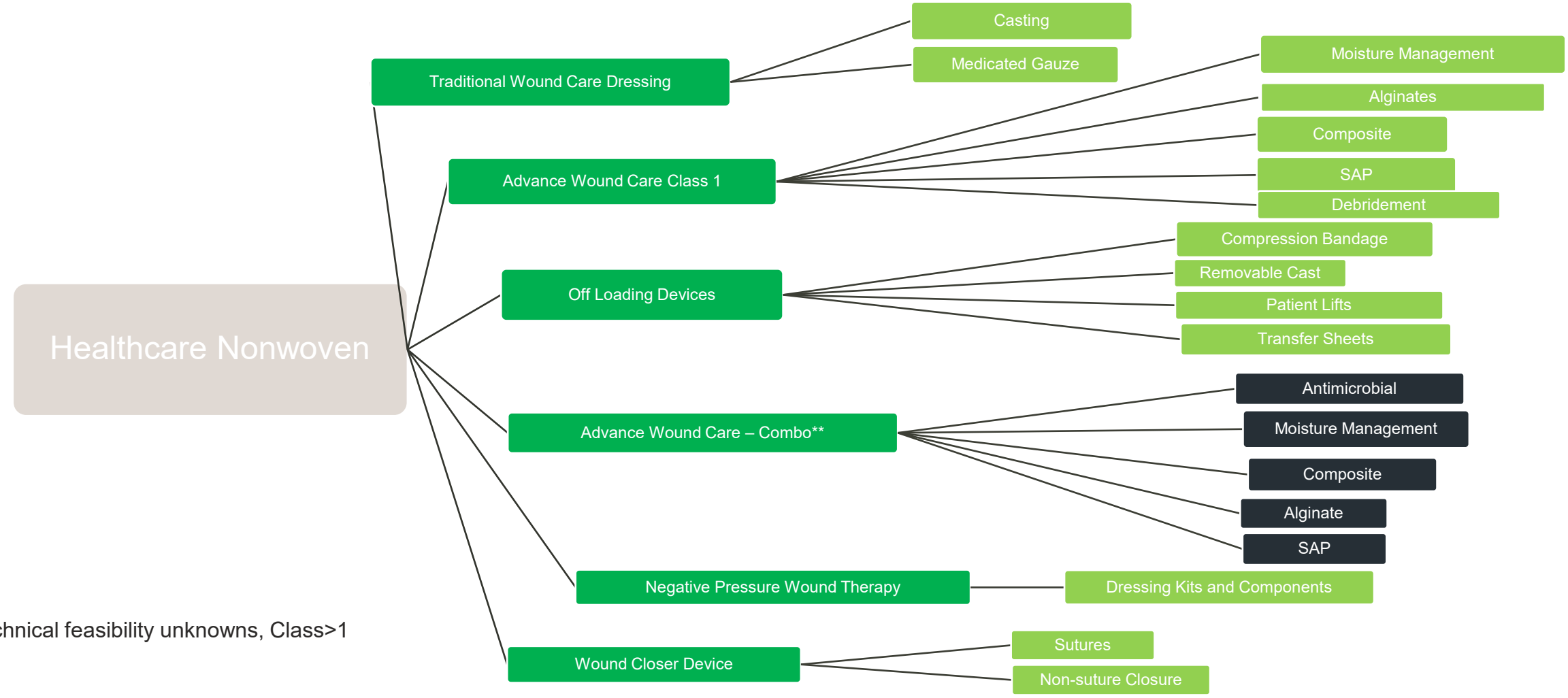
What Problems are we Solving?

We are currently focusing on active opportunities in moisture management, debridement and single use applications. The total market size ~$21B.



Wound Care Adjacency Map

Acteev is currently working with customers throughout the value chain and finding success in the wound care segment and adjacent markets



**Technical feasibility unknowns, Class>1

Value Chain

Advanced Wound care is comprised of 5 large companies that dominate the market with more that 250 medium to small companies that have niche products. Acteev will be a raw material provider to manufactures, strategic partners and contract manufactures.

	Raw Materials	Manufacturer	Seller	Distributor	End User

Activity	• Acteev sells raw material
	  • Pellets
	  • Staple fibers
	  • Yarns
		• Establish CTQ's
		• Product design
		• Bandage constructions
		• FDA submission
		• Provides claims and clinical evidence
			• Product branding
			• Poses the sales force to visit end user
			• Influence end user to product types
			• Pricing established
				• Poses the sales force to visit end user
				• Influence end user to product types
				• Provides pricing to end user
					• Select products through Group Purchasing Organization (GPO) contracts
					• Select product based on type of wound, fluid level, location

Types of Players	• Staple Fiber • Yarns • Woven and non-woven components • Spunbond	**Manufactures** • Molnlycke • Cardinal • Stryker **Strategic Partner** • Hartmann USA • Advanced Medical Solutions • UFP • Eastex & Superior Health	• Manufactures and distributors	• Distributors and online	• Integrated Delivery Networks (IDN) • Hospitals • Physician offices • Home health • Durable Medical Equipment (DME)
Major Players	MÖLNLYCKE HEALTH CARE, stryker, HARTMANN, CardinalHealth	MEDLINE, MÖLNLYCKE HEALTH CARE, HARTMANN, 3M Health Care	MEDLINE, Owens & Minor, McKESSON, CardinalHealth, HENRY SCHEIN	UPMC, MEMORIAL HERMANN, KAISER PERMANENTE	