From Nature to Fashion
Eastman Naia™ cellulosic fiber
Agenda

- Introducing Naia™
- Naia™ a catalyst for sustainable change
- The Naia™ advantage
  - Comfort
  - Ease of Care
  - Luxury
- Creating garments with cellulose acetate
- About Eastman
Introducing Naia™
Click image to link to video
The Naia™ sustainable fibers portfolio:

Naia™ cellulosic filament yarn:
- Comfort
- Luxury
- Ease of Care

Naia™ cellulosic staple fiber:
- Softness
- Quick-drying
- Reduced pilling

Approved for External Use
Naia™ is exceptionally VERSATILE

Let the ideas flow.

- Comfortable everyday wear from luxurious evening apparel to everyday casual wear.
- Blends well with silk, other cellulosic yarns/fibers, and recycled polyester
- Natural properties enable sublimation printing and heat setting
Naia™

A catalyst for sustainable change
To meet the future needs of a more sustainable fashion industry, Naia™ cellulosic fiber brings nature to fashion with a low environmental impact.
Eastman Naia™ offers a sustainable yarn and fiber...

**SUSTAINABLE ORIGIN**
Naia™ is responsibly sourced from sustainably managed pine and eucalyptus forests and plantations. Eastman and its wood pulp suppliers hold FSC® and/or PEFC™ Chain of Custody* certifications.

**SAFE AND ENVIRONMENTALLY SOUND CHEMICAL USE**
Naia™ is produced in a safe, closed-loop process where solvents are recycled back into the system for reuse. It is OEKO-TEX® 100 Product Class I certified and made with no hazardous chemicals listed on the ZDHC Manufacturing Restricted Substances List.

**A LOW-IMPACT MANUFACTURING PROCESS**
Naia™ is made through an optimized, low-impact manufacturing process with a low tree-to-fiber carbon and water footprint and a third-party reviewed life cycle assessment compliant with ISO 14044.

Naia™ is favorably ranked on the Higg Materials Sustainability Index.

**RETURN TO NATURE**
Naia™ received the TÜV AUSTRIA ‘OK Biodegradable’ certification for fresh water and soil environments and the ‘OK Compost’ certification for home* and industrial settings.

*Naia™ staple fiber is ‘OK Compost’ certified in home settings.
The Naia™ production process

**SUSTAINABLY MANAGED FORESTS AND PLANTATIONS**
The process starts with [pine and eucalyptus wood](#), sourced exclusively from sustainably managed and certified* forests and plantations in North America, Western Europe, and Brazil.

**WOOD PULP**
Sustainably sourced wood is turned into wood pulp, ready to enter the Naia™ production process in Eastman’s safe and efficient facility in the U.S.A., where 100% of Naia™ is produced.

**CELLULOSE ACETATE GRANULES**
Wood pulp is combined with acetic acid to make cellulose acetate granules.

**RECYCLING RESOURCES**
Solvents used in the process are recycled back into the system for reuse. Used water is cleaned and returned to the source with routine testing to ensure thriving biodiversity in the local river.

**SAFE AND SOUND SOLVENT USE**
Handled safely in a closed-loop process; the granules are dissolved in acetone to make a cellulose acetate dope solution.

**DRY SPINNING**
The dope is spun through tiny holes in a spinneret and air-dried to form cellulose acetate fiber. Dry spinning Naia™ does not require any water.

**SHIPPING-READY BOBBINS**
The cellulose acetate yarn is wound onto large bobbins—ready for shipping to fabric mills and Eastman warehouses around the world.

**SHIPPING-READY BALES**
The cellulose acetate staple fiber is compressed and baled—ready for shipping to yarn spinners around the world.

**LOW-IMPACT FASHION**
The result is a low-impact, sustainable cellulosic fiber that can be used in knit and woven fabrics and easily blended with other fibers. Naia™ delivers sustainability without compromise, with inherent softness, a cool touch, and versatility like no other.

Naia™ is OEKO-TEX® Standard 100 Product Class I certified and has been certified as biodegradable and compostable by TÜV AUSTRIA, allowing designers to feel good about choosing Naia™.

- Sustainably sourced wood pulp
- Solvents recycled and reused
- Low freshwater usage
- Biodegradable, compostable, and safe to wear

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* Suppliers hold FSC and/or PEFC Chain of Custody certification. Eastman has FSC-C140711 and PEFC/29-31-359.

** With a solvent recovery rate of approximately 97%.
How **sustainable** are the fibers you source?

<table>
<thead>
<tr>
<th>FIBER CATEGORIES &amp; EXAMPLES</th>
<th>ANIMAL BASED</th>
<th>PLANT BASED</th>
<th>MAN-MADE CELLULOSIC</th>
<th>SYNTHETIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Silk</td>
<td>Cotton</td>
<td>Viscose filament</td>
<td>Naia™ cellulosic fiber (acetate)</td>
</tr>
<tr>
<td>ORIGIN</td>
<td>caterpillar secretions</td>
<td>cotton plant</td>
<td>wood pulp cotton linter</td>
<td>no (oil based)</td>
</tr>
<tr>
<td>Impact on natural resources</td>
<td>high water use in cultivation; high use of pesticides in nonorganic cotton</td>
<td>may be sourced from endangered or ancient forests</td>
<td>sourced from sustainably managed** plantations</td>
<td></td>
</tr>
<tr>
<td>Biodegradable</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Chemical usage</td>
<td>pesticides used in cultivation</td>
<td>made with carbon disulfide</td>
<td>made with acetic acid and acetone</td>
<td></td>
</tr>
<tr>
<td>Closed-loop production</td>
<td>not applicable</td>
<td>not applicable</td>
<td>depends on manufacturer</td>
<td>yes</td>
</tr>
<tr>
<td>Water usage</td>
<td>high (cultivation)</td>
<td>high (cultivation)</td>
<td>medium (wet spinning)</td>
<td>low (dry spinning)</td>
</tr>
</tbody>
</table>

*The manufacturing process of modal can be considered similar to viscose staple.

**Suppliers hold FSC and/or PEFC Chain of Custody certification. Eastman has FSC-C140711 and PEFC/29-31-359.
The Naia™ advantage

Naia™ cellulosic filament yarn means...
- Comfort
- Luxury
- Ease of care

Naia™ cellulosic staple fiber means...
- Softness
- Quick-drying
- Reduced pilling

(Click images to advance to Naia™ filament yarn or staple fiber)
Naia™ cellulosic filament yarn means...

Comfort

Luxury

Ease of care
Naia™ cellulosic filament yarn means you feel comfort.

- Soft, smooth, and light fabric against your skin
- Refreshed and cool in a breathable garment
- Skin friendly and quick-drying
Naia™ cellulosic yarn means **comfort**.

**COOL TO TOUCH**

Coolness is inherent to Naia™ cellulosic yarn: this benefit won’t wash off or fade from fabrics over time.

Naia™ fabrics are

25% cooler than Polyester.*

*Test Method: Intertek, FTTS-FA-019

**HYPOALLERGENIC**

Skin friendly due to the hypoallergenic nature of the yarn.

More than 200 people wore Naia™ fabric intermittently over a 3-week period and no one experienced an adverse reaction.*


* Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results. This comparison was not intended to provide the effects of chemical finishes.
Naia™ cellulosic yarn means comfort.

** NATURAL BREATHABILITY **

The natural breathability translates into fabrics that allow moisture to pass through.

Naia™ fabrics are up to 2x as breathable as Nylon, Modal and Cotton.*


** QUICK DRYING **

Stay comfortable with quick drying garments made with Naia™.

Naia™ dries quicker than Nylon and Viscose and as quickly as Polyester.*

*Test Method: Intertek, AATCC 201

* Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results. This comparison was not intended to provide the effects of chemical finishes.
Naia™ cellulosic filament yarn means **easy to care for**.

- Launder garments easily at home
- Removes wine and coffee with ease
- Wear your garments regularly without fear of pilling
- Enjoy knit fabrics with excellent wrinkle recovery
Naia™ cellulosic yarn means ease of care.

* Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results. This comparison was not intended to provide the effects of chemical finishes.
With Naia™ cellulosic filament yarn, you can experience luxury.

- Stunning high luster fabrics or subtle, matte finishes
- Beautiful and effortless drape
- Limitless possibilities with blended fabrics
Naia™ cellulosic yarn means luxury.

**STUNNING LUSTER**

Inherently brings beautiful luster to fabrics.

Naia™ is 1.4x more lustrous than Nylon, Modal and Viscose.*

*Test Method: Precision Testing, ASTM D5023

**BEAUTIFUL DRAPE**

Enables effortless fabric drape to accentuate silhouettes.

Nearly 80% of fashion experts rated Naia™ as significantly more fluid than Viscose and Cupro.*

*Survey of 100+ fashion experts at Interfilière in Paris

**SILKY SOFT HAND**

Gives fabrics a soft and silky feeling.

Naia™ was selected as feeling softer than Viscose and Cupro.*

*Survey of 100+ fashion experts at Interfilière in Paris

Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results. This comparison was not intended to provide the effects of chemical finishes.
Naia™ cellulosic staple fiber means...
With Naia™ cellulosic staple fiber, you can experience comfort...

- Smooth, lasting softness against the skin
- Skin friendly and quick-drying
- Reduced pilling for lasting quality
- Cool, breathable garments
Naia™ cellulosic fiber means softness and quick-dry.

Naia™ cellulosic fibers are supremely soft, smooth, and cool next to skin.

Naia™ ranked superior in softness versus viscose and cupro.*

Naia™ delivers enduring softness in fabrics for longer lasting comfort.

Naia™ consistently improves dry rate, providing versatile blending options.**

Naia™ blends with lyocell and modal improve dry rates up to 30%.

*Survey of 100+ fashion experts at Interfilière Paris

**Test method: Intertek, AATCC 201
Naia™ cellulosic fiber means reduced pilling.

Naia™ cellulosic fibers consistently reduce pilling on fabrics when perfectly blended with other fibers.

Naia™ cellulosic fiber blended yarns safeguard fabrics against fuzz appearance after repeated wash and wear.

Naia™ blends with lyocell, modal, and polyester can improve the pilling grade up to 1 on a scale of 1–5 points.*

Creating *garments* with cellulose acetate
Revitalizing a versatile cellulosic fiber
Cellulose acetate is the perfect choice for fabrics in womenswear, intimate apparel, and linings.
About Eastman
A global industry leader

- Fortune 500 specialty materials company with 2018 revenue of $10 billion
- Global manufacturer and marketer of advanced materials and specialty additives
- Operates four business segments
- Global team of 14,500
- Serving customers in >100 countries
With a heritage of innovation and design

- Founded in 1920, Eastman began as the iconic Eastman Kodak.
- From photographic chemicals, we expanded our world-class technology to become a Fortune 300 company serving a variety of global markets, including the textiles industry!
Our mission is to enhance the quality of life in a material way . . .

- Vanceva® from Eastman for architectural interlayers
- Eastman Tenite™ cellulose esters for eyewear and accessories
- Eastman Amphora™ 3D polymer
- Eastman  Color Lab since 1934
- Eastman Naia™ cellulosic fiber

. . . and so much more!

. . . by working with designers, engineers, and technologists to develop innovative and sustainable products for everyday life.
Eastman is dedicated to environmental and social responsibility

Naia™ cellulose fiber is fully designed and produced by Eastman. A global specialty chemical company founded nearly a hundred years ago, Eastman is more than just a fiber manufacturer. Dedicated to environmental stewardship, social responsibility, and economic growth, Eastman strives to work collectively with partners and customers to continually improve processes and create sustainable value. The following awards and association memberships are proof of Eastman’s strong commitment to leave a positive impact on the world.
Questions?
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APPENDIX
Sustainable sourcing
We are committed to sustainable forestry management.

“With a portfolio of biobased products derived from wood pulp, it is critical that we help ensure sustainable forestry and the conservation of ancient and endangered forests. Eastman takes a holistic and systems-based approach to sustainable forest management as outlined in our updated Sustainable Dissolving Wood Pulp Sourcing Policy. We are proud to collaborate with Canopy to enable a more sustainable supply chain in the markets we serve.”

— Brad Lich, EVP and chief commercial officer

“We are integrating sustainability across Eastman’s supply chain, meeting customer and consumer demand while ensuring sustainable sourcing and production. Partnering with organizations like Canopy supports our continued efforts to deepen that integration.”

— Mark Costa, CEO and chairman of the board
Eastman awarded FSC® / PEFC™ Chain of Custody

The facility(ies) and product(s) listed above have been certified as
PEFC Chain of Custody Certified

This certificate cannot be presented as evidence that certified wood products have been supplied. In all cases, such evidence must be conveyed on the corresponding sales documentation.

Sustainable Forestry Initiative (SFI) Program Certification

SFI Chain of Custody Certified

This certificate cannot be presented as evidence that certified wood products have been supplied. In all cases, such evidence must be conveyed on the corresponding sales documentation.

FSC Mix

The assessment has been conducted by SCS Global Services in accordance with the protocols of the Forest Stewardship Council® A.C. (FSC®)


Certificate Code: SCS-COC-006296 Trademark License Code: FSC-C140711

Valid from: 18 April 2018  Expiry date: 17 April 2023

Sarah Harris, Managing Director
SCS Global Services
3000 Powell Street, Ste. 600, Emeryville, CA 94608 USA

/Naia™/ from nature to fashion

CoC certifications cover Naia™ cellulosic yarn
Eastman is committed to sourcing sustainable wood pulp

Eastman NaiaTM cellulose yarn

As seen on www.naifromeastman.com

Policy updated in 2019 – available at www.eastman.com
Key partnerships and collaborations

Ellen MacArthur Foundation
Eastman joined the Ellen MacArthur Foundation’s Circular Economy 100 (CE100) to create solutions to enable a more circular economy.

FSC® and PEFC™
Eastman and its wood pulp suppliers hold FSC® and/or PEFC™ Chain of Custody certifications. Additionally, Eastman has partnered directly with FSC® to promote FSC Mix for Eastman Naia™ cellulosic fiber.

Canopy
Eastman’s commitment to sustainable forestry management has been recognized through the 2019 Canopy Hot Button Report, showing that Eastman has zero risk of sourcing from ancient and endangered forests.

C.L.A.S.S. (Creativity Lifestyle and Sustainable Synergy)
Naia™ recently joined C.L.A.S.S. to support the fashion industry’s shift toward the circular economy, empowering businesses to be competitive and socially responsible.

Quantis
Eastman participates in the Plastic Leak Project, an initiative led by Quantis to contribute to the global effort to fight plastic pollution.
Testing

For Naia™ filament yarn
Comfort testing
Coolness is inherent to Naia™

Dry rate (AATCC 201, Intertek 2018)

Grading scale of 1–5, with 5 being the best

Naia™ fabrics are 25% cooler than polyester.

* Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results.
Test methods

Comfort

<table>
<thead>
<tr>
<th>Test number</th>
<th>Test description</th>
<th>Where tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>FTTS-FA-019, v 3.0</td>
<td>Instant cool-to-touch</td>
<td>Intertek</td>
</tr>
<tr>
<td>Hand survey</td>
<td>Instant cool-to-touch</td>
<td>Focus group</td>
</tr>
<tr>
<td>Hand survey</td>
<td>Silkiness</td>
<td>Focus group</td>
</tr>
<tr>
<td>ASTM D1388-Option A</td>
<td>Drape</td>
<td>Vartest</td>
</tr>
</tbody>
</table>

Silkiness: An internal hand survey composed of 31 panelists was used to assess silk-like handle and yielded statistically significant results.

Cool-to-touch: Several different techniques were employed to evaluate the cool-to-touch handle. $Q_{\text{max}}$ measures the heat flow per unit area required to maintain the fabric at the equilibrated skin temperature. This technique was carried at using the Kawabata $Q_{\text{max}}$ method at Intertek. An internal hand survey was also carried out and yielded statistically significant results.
Test methods

Dry Rate

<table>
<thead>
<tr>
<th>Test number</th>
<th>Test description</th>
<th>Where tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>AATCC 201-2014</td>
<td>Drying rate of fabrics</td>
<td>Intertek</td>
</tr>
</tbody>
</table>

**Breathability**: Evaporative resistance in a controlled environmental chamber was used to assess breathability. Fabrics were placed on a heated plate with air moving across the top of the sample while water vapor was generated on the bottom side of the fabric to mimic sweating. Lower resistance of a fabric to evaporation corresponds to better breathability.

**Dry rate**: The time required to evaporate 200 uL of added liquid water with the fabric on a heated plate with air moving across the top of the fabric.
Test methods

Skin sensitivity

Testing was carried out at Consumer Product Testing Co. by protocol number CP-01.01S, which is called the Human Repeated Insult Patch Test. 200+ subjects completed the study. Patches of the acetate fabric were applied 3 times per week for a total of 9 applications to the same site. Patches were placed onto skin for 24 hours during each application. None of the subjects displayed an adverse reaction to the fabric.

The summary from the report states, “Under the conditions of this study, test material, acetate knit fabric Lot 6385, indicated no potential for dermal irritation or allergic contact sensitization.”
Ease of care testing
Wear Naia™ garments with no fear of pilling.

Pilling resistance (ASTM D3512, Intertek)

* Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results.

Testing shows that Naia™ resists pilling. *
Tough stains are easily washed away with Naia™.

Soil release (AATCC 130-2010, Wash Procedure II, Intertek)

Grading scale of 1-5, with 5 being the best.

Naia™ knit fabrics can be washed at home to easily remove tough stains like red wine and coffee.*

Higher grade corresponds to better removal of the stain after one (1) home laundering in cold water on normal cycle followed by tumble dry on low.

* Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results.
## Test methods

### Ease of Care

<table>
<thead>
<tr>
<th>Test number</th>
<th>Test description</th>
<th>Where tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>AATCC 135-2015; Test No (1)IIA(II)</td>
<td>Dimensional stability to laundering</td>
<td>Intertek</td>
</tr>
<tr>
<td>AATCC 130-2010; Wash procedure II</td>
<td>Soil release</td>
<td>Intertek</td>
</tr>
<tr>
<td>AATCC 128</td>
<td>Wrinkle recovery</td>
<td>Intertek</td>
</tr>
</tbody>
</table>

**Dimensional stability to laundering:** Benchmarks were drawn on the fabrics. Fabrics were laundered three times (normal wash in cold water; tumble dry low). Benchmarks were measured to assess dimensional stability.

**Soil release:** Each of six tested soils were applied to the fabrics. Fabrics were then laundered then graded for the extent of soil release.

**Wrinkle recovery:** Fabrics were wrinkled under standard atmospheric conditions in a standard wrinkling device under a predetermined load for a prescribed period of time. The fabric is then reconditioned and evaluated visually for appearance.

**Pilling:** Fabrics are mounted on polyurethane tubes and tumbled randomly in a cork-lined box at a constant rotational speed. Fuzzing and pilling are assessed visually after 5 hours of tumbling.

### Durability

<table>
<thead>
<tr>
<th>Test number</th>
<th>Test description</th>
<th>Where tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 12945-1:2000</td>
<td>Pilling resistance</td>
<td>Intertek</td>
</tr>
</tbody>
</table>

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Eastman Chemical Company
Approved for External Use
Luxury testing
Inherently brings **stunning luster** to fabrics.

Naia™ is 1.4x more lustrous than Nylon, Modal and Viscose.

* Based on results from applicable test methods; yarn composition, fabric construction, and finishing can vary results.
Test methods

Luxury

<table>
<thead>
<tr>
<th>Test number</th>
<th>Test description</th>
<th>Where tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASTM D523</td>
<td>Luster</td>
<td>Vartest</td>
</tr>
<tr>
<td>ASTM D1388-Option A</td>
<td>Drape</td>
<td>Vartest</td>
</tr>
<tr>
<td>Hand survey</td>
<td>Silkiness</td>
<td>Focus group</td>
</tr>
</tbody>
</table>

**Luster:** Gloss readings were taken with a gloss meter along the length, width, and bias of the fabric.

**Drape:** An evaluation using test ASTM D1388-Option A by Vartest laboratories in New York, NY. Strips of fabric were pushed off the edge of a platform and allowed to drape. The length of fabric pushed off the edge before reaching a given bending radius was reported.

**Silkiness:** An internal hand survey composed of 31 panelists was used to assess silklike handle.
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