

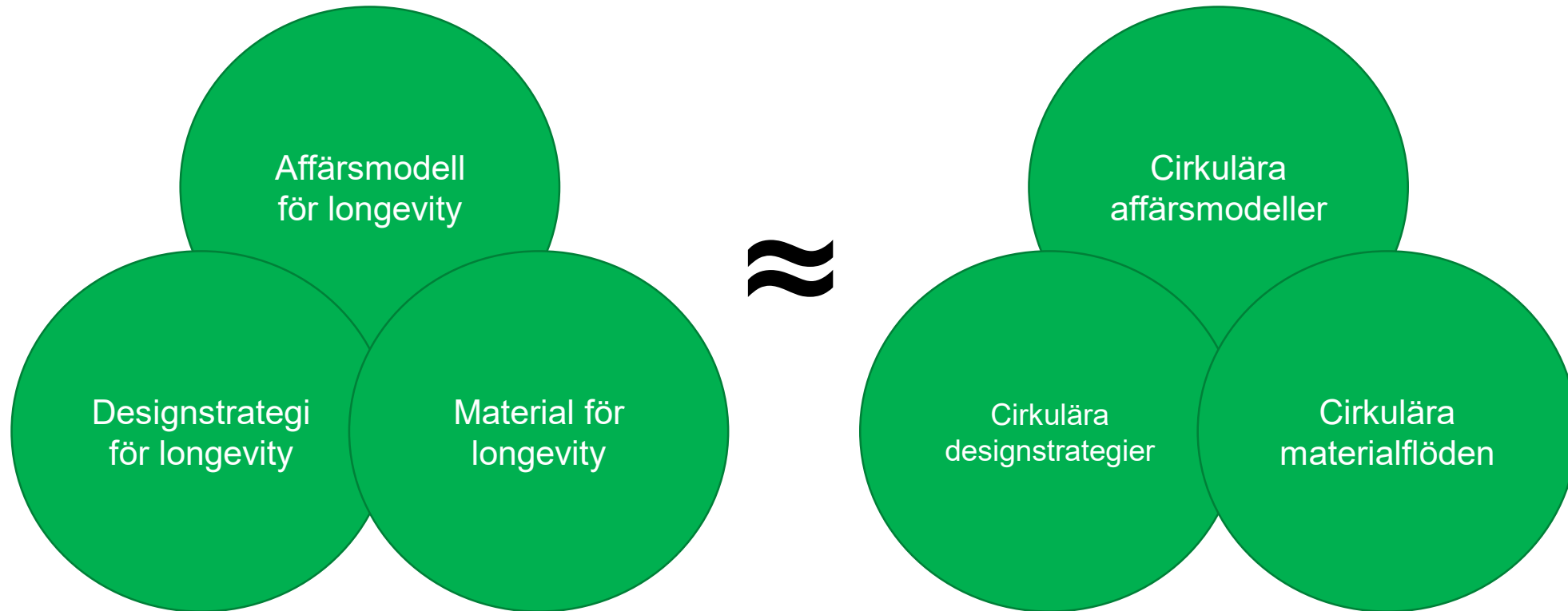
Konsekvensanalys

Design for longevity



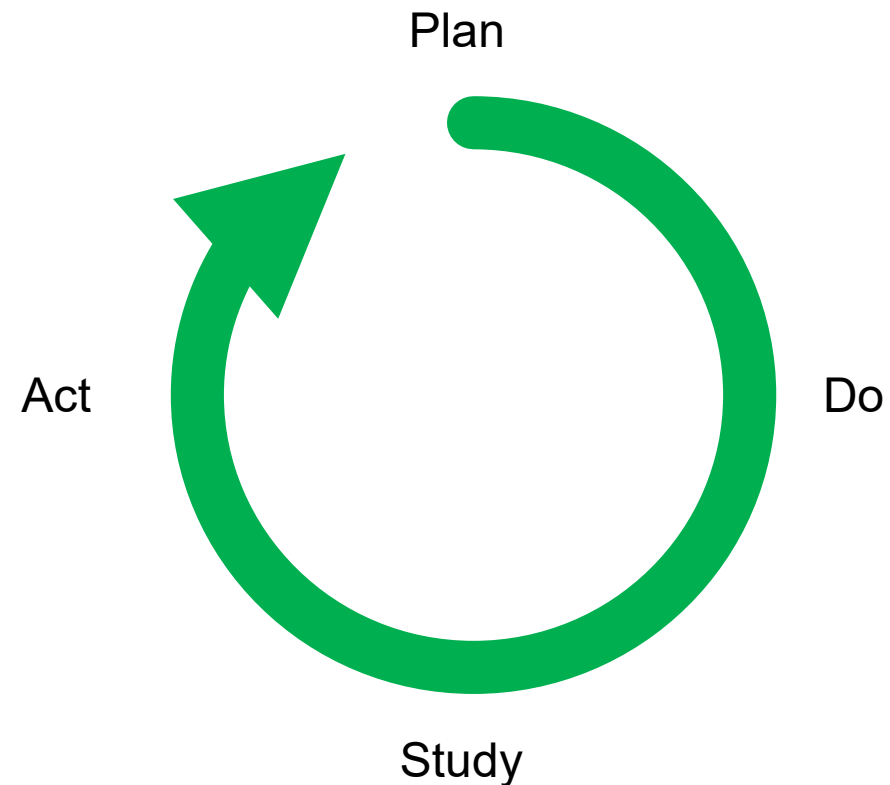
SUSTAINABILITY
BY SWEDEN
THE NATIONAL PLATFORM

Del av en större ansats

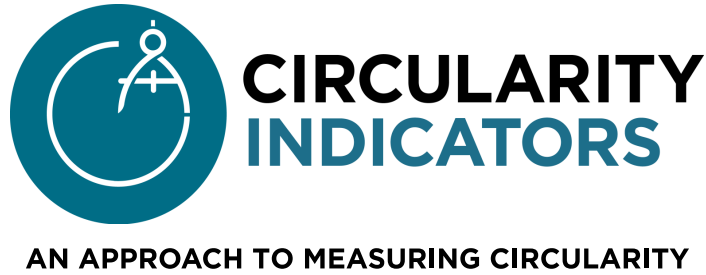


Syfte

Syftet med övningen är att ge er verktyg för att göra en övergripande konsekvensanalys för en sammansatt textil produkt.



Verktyg



Litteratur



Preferred Fiber & Materials
Market Report 2020



Heads up!

Ni kommer inte älska något av verktygen men ni ska förstå hur de kan användas för att utvärdera era produkter. Uppenbara nedsidor inkluderar:

- Inget tydligt longevity-perspektiv i Higg PM
- Inget tydligt end-of-use perspektiv, men frågor om överproduktion!
- Longevity-perspektivet svårsmädd i MCI
- MCI är otydligt kring hur avfall från produktion hanteras.

Använd verktygen enligt devisen "hellre nästan rätt än definitivt fel"

Utmaningar med att bestämma plaggs uthållighet

- Brist på standardiserade metoder
- De som finns efterliknar inte verkligheten i tillräcklig omfattning
- Design- och produktutvecklingsbeslut beträffande plaggs uthållighet är därför avhängigt organisationens, designerns eller produktutvecklarens **erfarenhet**.
- Tillbehör, typ dragkedjor är lite eftersatt
- Sammantaget blir det mer en **bedömning** av ett plaggs uthållighet.



Material Circularity Indicator, MCI

- Utvärdering/Bedömningsverktyg för att hjälpa företag med inköp av material.
- Hjälper också till att identifiera cirkulärt värde hos företagens produkter



Från Ellen Mc Arthur, viktigt att förstå i sammanhanget

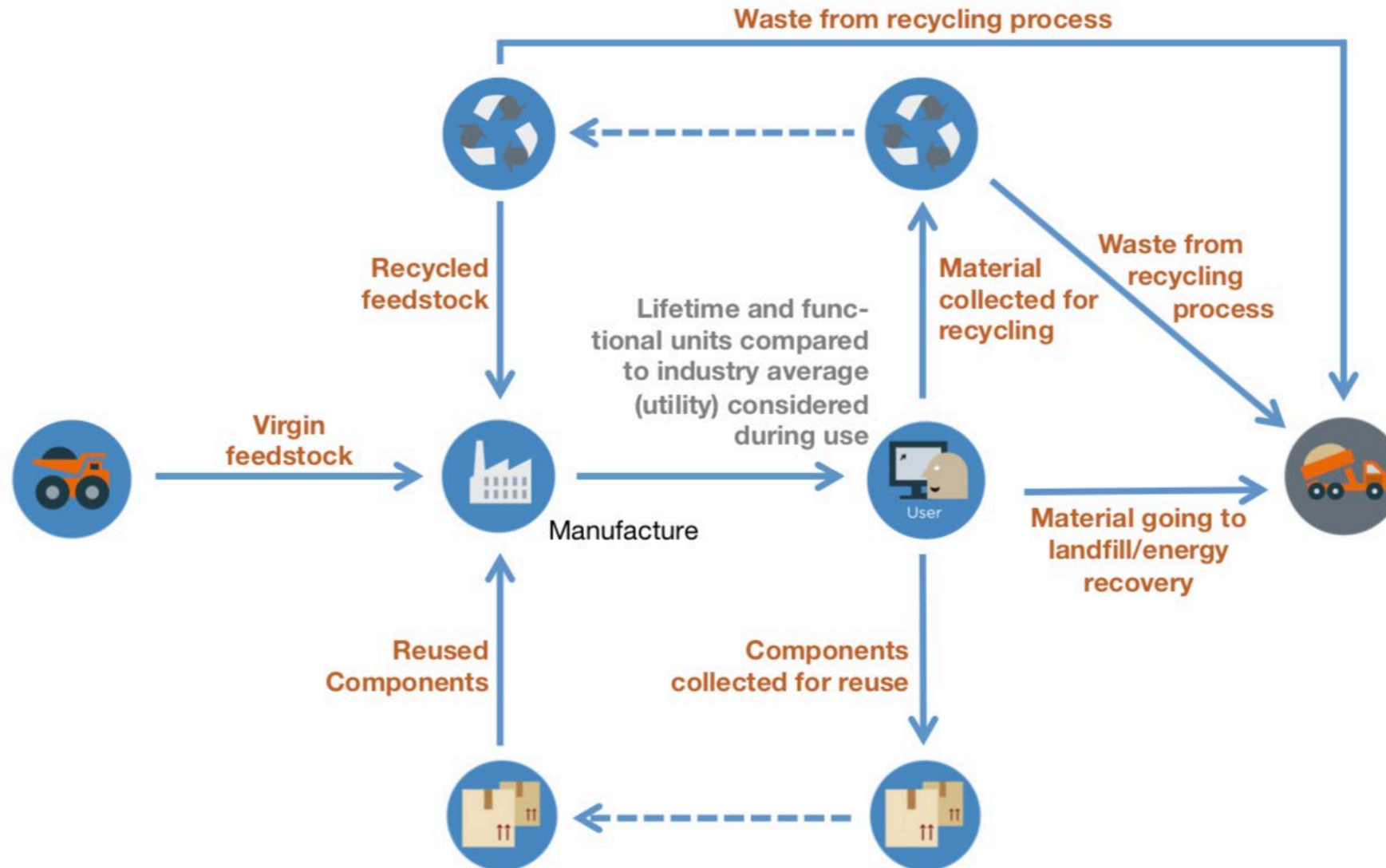
A circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems.

Källa: <https://www.ellenmacarthurfoundation.org/circular-economy/what-is-the-circular-economy>


Material Circularity Indicator, MCI

1. Hur mycket av materialet i en produkt kommer från
 1. Jungfruliga källor
 2. Återvunna källor
 3. Återanvända källor?
2. Hur mycket av produkten går att
 1. Återvinna
 2. Återanvända?
3. Hur många användningar har plagget i sig 🙄
 1. I tid
 2. I antal gånger, t. ex. i jämförelse med branschstandard för produkttypen?
4. Hur stor del av produkterna, när de har brukats, samlas in för att
 1. Återvinnas
 2. Återanvändas
5. Hur stor andel av det avfall som genereras vid tillverkningen av produkten går att.
 1. Återvinna
 2. Återanvända?

Flöde




MCI, Dynamic Modelling Tool




CIRCULARITY INDICATORS

AN APPROACH TO MEASURING CIRCULARITY



#DIVISION/0!






ELLEN MACARTHUR FOUNDATION

Material Circularity Indicator Dynamic Modelling Tool

Drag the sliders to change input values and see how the MCI changes!

| | Feedstock | Destination after use |
|----------------------|----------------------------------------------------------|---------------------------------------|
| Reused | <input type="range" value="0%"/> 0% | <input type="range" value="0%"/> 0% |
| Recycled | <input type="range" value="0%"/> 0% | <input type="range" value="0%"/> 0% |
| Recycling efficiency | <input type="range" value="0%"/> 0% | <input type="range" value="80%"/> 80% |
| Lifespan | <input type="range" value="1.0"/> 1,0 x industry average | |
| Functional units | <input type="range" value="1.0"/> 1,0 x industry average | |






Computation of the MCI:

| | |
|--------|--------------|
| V | 1,00 |
| W_0 | 1,00 |
| W_F | #DIVISION/0! |
| W_C | 0,00 |
| W | #DIVISION/0! |
| X | 1,00 |
| $f(X)$ | 0,90 |
| LFI | #DIVISION/0! |
| MCI | #DIVISION/0! |



MCI Company Level Aggregator Tool



CIRCULARITY INDICATORS
AN APPROACH TO MEASURING CIRCULARITY

Company Level Aggregator Tool


This spreadsheet can be used to aggregate a set of reference product data together using a selected normalising factor. First select the normalising factor from the drop down box. Next enter data for each reference product. If there are more than 20 reference products, insert more rows in the table. Click the 'Add Labels' button to add labels to the points on the chart.

Select normalising factor: product mass

| No. | Name of product range | Total product mass of product range | MCI of ref. product |
|-----|-----------------------|-------------------------------------|---------------------|
| 1 | Product range 1 | 1 000 | 0,10 |
| 2 | Product range 2 | 500 | 0,65 |
| 3 | Product range 3 | 100 | 0,10 |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |
| 14 | | | |
| 15 | | | |
| 16 | | | |
| 17 | | | |
| 18 | | | |
| 19 | | | |
| 20 | | | |

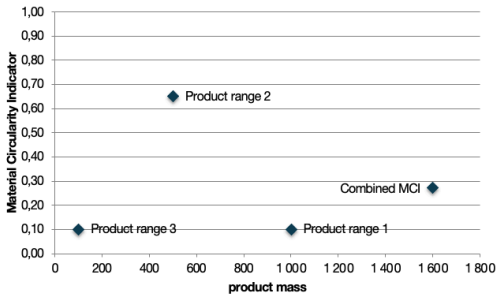
Total product mass 1 600

Combined Material Circularity Indicator 0,27



Combined Material Circularity Indicator
MCI = 0.00

Add Labels





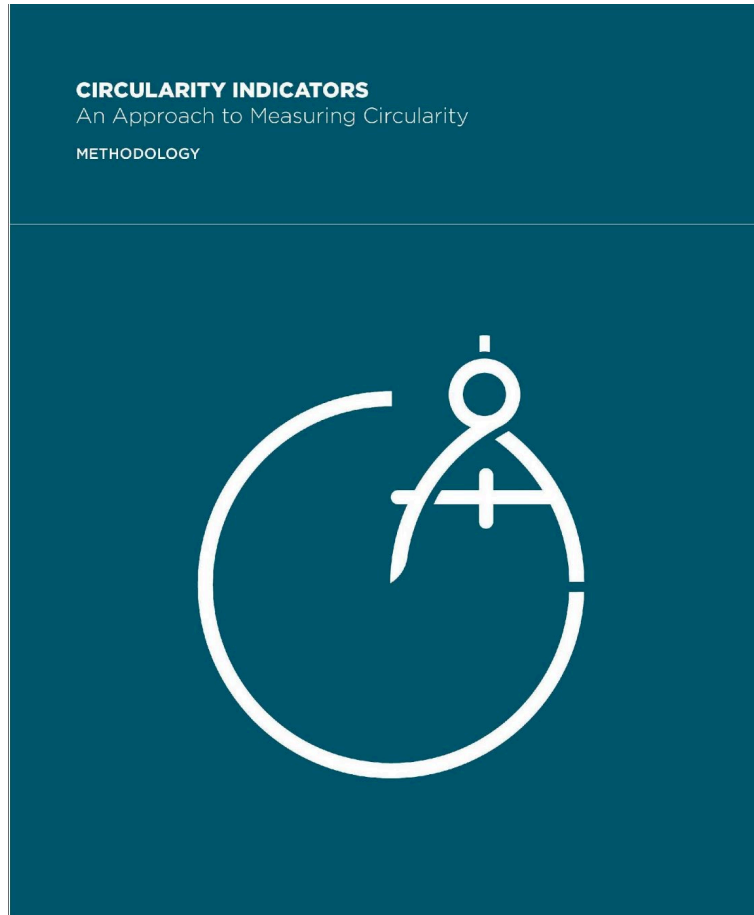
ELLEN MACARTHUR FOUNDATION



GRANTA MATERIAL INTELLIGENCE



Metod



- Antaganden och begränsningar
- Indikatorn föredrar inte helt stängda loopar. T. ex. måste inte återtaget material återvända till den ursprungliga tillverkaren.
- Det antas att återtaget material kan processas till liknande kvalitet som det jungfruliga materialet.
- Det antas att inget materialspill finns i förberedelse för återanvändning av insamlade produkter.
- Det antas att produktens massa inte ändras mellan tillverkning och slutet på dess användning. Ingen del av produkten konsumeras, t. ex. äts eller bränns under produktens användande.

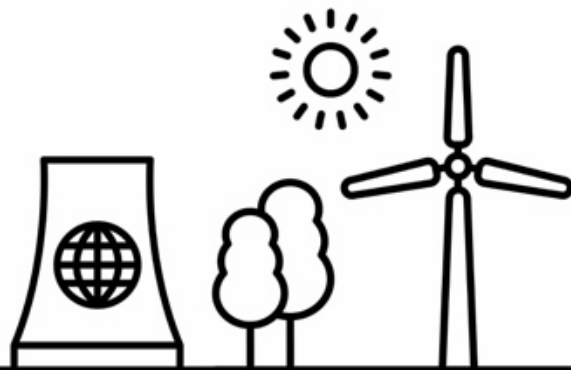
<https://www.ellenmacarthurfoundation.org/assets/downloads/Circularity-Indicators-Methodology.pdf>

HIGG MSI IMPACTS

The Higg MSI uses life-cycle assessment data to assess the environmental impacts of materials in apparel, footwear, and textile products.

The Higg MSI Measures

5 ENVIRONMENTAL
IMPACTS OF MATERIAL
PRODUCTION



Global Warming Potential



Nutrient pollution in water
(eutrophication)



Water scarcity



Fossil fuel depletion



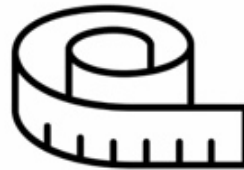
Chemistry

HIGG MSI BENEFITS

By using the Higg MSI, companies can



IDENTIFY
OPPORTUNITIES TO
REDUCE IMPACTS

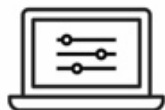


MAKE PROACTIVE
DESIGN CHOICES



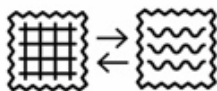
DESIGN MORE
SUSTAINABLE
PRODUCTS

HIGG MSI IN ACTION



Review the impacts of your materials

Customize the production processes of the Higg MSI's 88 example materials to determine the environmental impacts of your company's unique materials.



Compare materials to make better choices

Evaluate materials options side by side to understand environmental trade-offs based on different production processes.



Choose better materials

Use insights from the Higg MSI to select better materials for a product.



**CREATE MORE
SUSTAINABLE
PRODUCTS
WITH LOWER
ENVIRONMENTAL
IMPACTS**

REVIEW



COMPARE












CHOOSE



CREATE

Higg Index Material Sustainability Index (Higg MSI)

| Name | Impact | Impact | | Benchmark | | <input checked="" type="checkbox"/> MSI Score | <input type="checkbox"/> Life Cycle Impact Assessment |
|--------------------------------------------------------------------------------------------------------------------------------|--------|----------------|----------------|----------------|----------------------------------|-----------------------------------------------|-------------------------------------------------------|
| | | Global Warming | Eutrophication | Water Scarcity | Resource Depletion, Fossil Fuels | Chemistry | |
|  TEXTILES Acetate, Triacetate fa... | 79.6 | 18.1 | 12.9 | 18.0 | 20.3 | 10.3 | + |
|  TEXTILES Acrylic fabric | 48.7 | 14.3 | 6.32 | 1.36 | 17.3 | 9.44 | + |
|  TEXTILES Alpaca Fabric | 320 | 77.8 | 222 | 1.24 | 9.22 | 9.29 | + |
|  TEXTILES Aramid fabric | 32.9 | 9.76 | 2.46 | 0.605 | 13.0 | 7.13 | + |
|  TEXTILES Carbon fiber fabric | 64.5 | 18.7 | 16.6 | 2.06 | 23.1 | 4.04 | + |
|  TEXTILES Cotton fabric | 101 | 8.80 | 17.6 | 57.1 | 6.69 | 10.9 | + |
|  TEXTILES Elastane/Spandex fab... | 35.1 | 8.63 | 6.72 | 5.57 | 9.22 | 4.94 | + |
|  TEXTILES Flax fiber fabric | 92.5 | 13.6 | 52.3 | 3.43 | 12.0 | 11.1 | + |
|  TEXTILES Glass fiber fabric | 13.0 | 4.34 | 1.56 | 0.403 | 3.81 | 2.92 | + |

Higg Index Product Modul (Higg PM)

| Name | Style Number | Season | Product Cate... | Impact Areas | | | | |
|-----------------------------------------------------------------|--------------|--------|-----------------|------------------|--------------------|---------------|--------------|------------|
| | | | | Global Warmin... | Eutrophication | Water Scar... | Resource ... | Chemistry |
| Women S/S 22 Sweater (Tencel Version) | SNK 112020 | Spring | Shirt | 1.86 kg CO2 eq | 0.002 kg PO4--- eq | 1.08 m3 | 26.0 MJ | 3.59 units |
| Fleece zip up hoodie, 100% polyester | 207583322 | Spring | Sweater | 3.95 kg CO2 eq | 0.036 kg PO4--- eq | 1.11 m3 | 70.0 MJ | 8.72 units |
| Group 4 Utility Jacket 100 wool revised | CORE2035 | | Jacket | 6.83 kg CO2 eq | 0.057 kg PO4--- eq | 2.20 m3 | 82.3 MJ | 12.6 units |
| 58/42 Recycled cotton / Organic Pima Cotton Sweater Alternative | FEML3n | Fall | Sweater | 0.558 kg CO2 eq | 0.004 kg PO4--- eq | 0.112 m3 | 8.46 MJ | 1.63 units |
| Women S/S 22 Sweater(Terry fabric) | SNK 112020 | Spring | Shirt | 2.41 kg CO2 eq | 0.020 kg PO4--- eq | 3.63 m3 | 27.7 MJ | 5.43 units |
| bavi | 12234 | Spring | Shirt | 0 kg CO2 eq | 0 kg PO4--- eq | 0 m3 | 0 MJ | 0 units |
| 95/ 5 Polyester Lycra Womens Leggings Group 12 | 95P5LCOS... | Fall | Leggings Tights | 9.01 kg CO2 eq | 0.037 kg PO4--- eq | 2.57 m3 | 135 MJ | 15.8 units |

NUDIE JEANS SUSTAINABLE MATERIAL TOOL

Although organic cotton is the main material we work with, we strive to use other sustainable materials for non-denim products. In 2018, we created the Nudie Jeans Sustainable Material Tool with the aim of guiding our designers and product developers to achieve Nudie Jeans goal to work with 100% sustainable materials.

The Nudie Jeans Sustainable Material Tool is based on Made By's Environmental Benchmark for Fibers and the Higg Materials Sustainability Index (MSI). We have chosen these two benchmarks because they complement each other with both a clear classification (Made By) and more detailed insight into the complexity of the impacts of different fiber types (MSI). Other benchmarks, such as Textile Exchange's Preferred Material benchmark which we participate in annually, offer instead a comparable benchmark of volumes and fiber type usage from a brand perspective. The Preferred Material Benchmark therefore provides valuable insight into industry material use, rather than serving as a fiber classification tool.

The Nudie Jeans Sustainable Material Tool has three categories of sustainable fibers, all of which are defined as Sustainable by Nudie Jeans. By sorting them as seen below, we want to highlight the most sustainable and circular fibers, with the

aim of pushing our development further and challenging the industry to scrutinize the definition and use of sustainable fibers.

To complement the Sustainable categories, there is a Non-Sustainable category for fibers that may be used for Nudie Jeans products, that are not defined as Sustainable, and a Do Not Use category for fibers that should not be used in Nudie Jeans products at all.

1. Scope: Recycled, Recyclable, Reused and Biodegradable.
2. Scope: Recyclable but not biodegradable, certified virgin materials. RWS or GOTS certified wool.
3. Scope: RWS or GOTS certified animal hair and fibers. For leather; certified organic meat and vegetable tanning processes.
4. Scope: Conventional virgin fibers, high process chemical usage, lack of controlled animal welfare.
5. See Nudie Jeans Animal Welfare Policy

| SUSTAINABLE FIBERS | | |
|---------------------------------------------|--------------------------|----------------------------------------|
| CLASS 1 ¹ | CLASS 2 ² | CLASS 3 ³ |
| Recycled cotton | Recycled polyester | Certified alpaca |
| Reused Nudie Jeans | Recycled nylon | Certified yak |
| Recycled wool | Certified organic cotton | Certified mohair |
| Traceable, organic and/or Fairtrade cotton. | Certified wool | Certified organic silk |
| Certified organic jute | Certified organic linen | Certified and vegetable tanned leather |
| TENCEL™ Lyocell | Certified organic hemp | |

| NOT SUSTAINABLE ⁴ | | DO NOT USE ⁵ |
|--------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------|
| Conventional linen | Virgin elastane / spandex | Feather and down |
| Conventional hemp | Virgin polyester | Leather from aborted animals such as slink, karakul and Persian lamb |
| Conventional cotton | Virgin nylon | |
| Fairtrade conventional cotton | Conventional and virgin wool and animal hair | Hair from animals reared in cages |
| Better Cotton Initiative (BCI) | Virgin acrylic | Fur |
| Viscose | PLA | Leather and skin from wild-caught animals, exotic animals or vulnerable and endangered species |
| Bamboo viscose | Leather | |
| Acetate | Peace silk | Conventional silk |
| Modal | Cupro | Mohair and Cashmere will be phased out in all Nudie Jeans products with start of collection W19 |
| | | |

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MADE-BY ENVIRONMENTAL BENCHMARK FOR FIBRES



www.made-by.org

| CLASS A | CLASS B | CLASS C | CLASS D | CLASS E | UNCLASSIFIED |
|---------------------------------|-----------------------------------|---------------------------|----------------------------------|---------------------|----------------|
| Mechanically Recycled Nylon | Chemically Recycled Nylon | Conventional Flax (Linen) | Modal® (Lenzing Viscose Product) | Bamboo Viscose | Acetate |
| Mechanically Recycled Polyester | Chemically Recycled Polyester | Conventional Hemp | Poly-acrylic | Conventional Cotton | Alpaca Wool |
| Organic Flax (Linen) | GRAILAR® Flax | PLA | Virgin Polyester | Cuprammonium Rayon | Cashmere Wool |
| Organic Hemp | In Conversion Cotton | Ramie | | Generic Viscose | Leather |
| Recycled Cotton | Monocel® (Bamboo Lyocell Product) | | | Rayon | Mohair Wool |
| Recycled Wool | Organic Cotton | | | Spandex (Elastane) | Natural Bamboo |
| | TENCEL® (Lenzing Lyocell Product) | | | Virgin Nylon | Organic Wool |
| | | | | Wool | Silk |
| More Sustainable | | | Less Sustainable | | |

MADE-BY Benchmarks cannot be printed, circulated or copied without the accompanying MADE-BY logo and website.

bwe This Benchmark was made in cooperation with Brown and Wilmanns Environmental, LLC. For further information on this Benchmark see www.made-by.org/benchmarks

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COUNCIL



TEKO | SVERIGES TEXTIL-
& MODEFÖRETAG





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