NIKE MATERIALS SUSTAINABILITY INDEX

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JULY 2012
SAC RELEASE

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Accessing Attached Nike MSI Files and Supporting Documents

This PDF contains attached files, including the Nike MSI dynamic spreadsheets used to score materials and other supporting documents. The files are listed alphabetically in a directory of files at the bottom of the Acrobat document window.

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Letter of Invitation to Members of the Sustainable Apparel Coalition

July, 2012

Materials drive the majority of environmental impacts across the product life cycle. When you consider that Nike Footwear and Apparel designers have access to 80,000 materials from 1,400 suppliers, the enormity and complexity of the decision making process for selecting more sustainable materials becomes apparent. Despite demand from our product creation teams for meaningful information about the environmental impacts of materials, this information has been difficult to obtain, expensive, proprietary and often dependent on supply chains that are quite different from our own.

Unable to find a commercially available material evaluation tool, we created the Nike Materials Sustainability Index (Nike MSI). The result of more than eight years of materials research and analysis, it is our 'thesis' about how to provide guidance to product creation teams for selecting materials with lower environmental impacts, as reflected by better scores on Nike MSI.

All footwear and apparel companies face similar issues regarding the lack of materials information. Because we believe that there should be a system-wide approach to problem solving and innovation within our industry, we are making Nike MSI publicly available. We hope that sharing this information will stimulate an open discussion about how best to evaluate materials as well as inspire brands and manufacturers to release their information for the benefit of all.

We believe that the Sustainable Apparel Coalition (SAC) is the group best positioned to drive the discussion and act as an impartial trusted editor to improve collective data. To that end, Nike provided SAC members, and a Technical Review Committee sanctioned by SAC and led by Duke University, with access to all Nike MSI documentation, worksheets, primary data and algorithms.

The committee, comprised of leading academics in the fields of life cycle assessment, materials assessment and sustainable systems analysis, performed a review of Nike MSI. They submitted a detailed report, which included critical, important and operational findings, to the SAC along with their recommendation regarding use of Nike MSI within SAC product indexes. We have incorporated the Technical Review Committee's "draft" critical findings, listed below, into Nike MSI.

- **Intended Use**. Nike MSI documentation clearly communicates Nike MSI's intended purpose, targeted users, phase of the product creation process influenced, limitations of the tool, and the structure and weighting of the scoring framework.

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- **Data Transparency**. We removed materials from Nike MSI that relied on proprietary data. After validating changes to the tool resulting from committee feedback, we expanded annotations, sources and algorithms to make data even more transparent.
- **Scoring Framework**. Nike MSI documentation clearly outlines the scoring framework, which balances indicators across four environmental impact areas to deliver relative material scores for making decisions in a commercial context.
- **Scope of Study**. To better align Nike MSI with generally accepted practices, we have added feedstock energy to material process energy.
- **Sensitivity**. To reward incremental improvement, Nike MSI replaced step functions, which bucketed data to produce scores within upper and lower limits, with new functions.
- **Trade-offs**. A future "federated" wiki—a next-generation wiki that enables a unified view of data and content from diverse owners—will enable users to assess the trade-offs between two or more materials, using radar graphs to visualize and compare graphical representations of the impact areas.
- **Proxy Data**. Nike MSI documentation clearly outlines why we use proxy data to score materials that would otherwise be omitted from the tool.
- **Chemistry**. The Chemistry portion of Nike MSI should be reviewed and aligned with an industry standard when one is created.

We appreciate the tremendous effort the Technical Review Committee made to improve Nike MSI. The full SAC membership voted to include Nike MSI in SAC product indexes in June 2012.

As always, we encourage discussion, feedback and input to improve and build upon the tool. Please see the attached file NikeMSI_Refinements.pdf for ways to collaborate on Nike MSI.

Regards,

Lorrie Vogel
General Manager, Sustainable Product R & D
NIKE, Inc.

Jim Goddard
Director of Considered Design, Sustainable Business & Innovation
NIKE, Inc.

Licensing

Nike MSI is the result of more than eight years of researching, compiling and analyzing publicly available information on a wide variety of materials. As Nike MSI gains industry exposure, we hope that other companies, consultants, materials suppliers and academics will release additional material information.

Nike is releasing Nike MSI under three licenses that enable interested parties to use and improve upon the tool.

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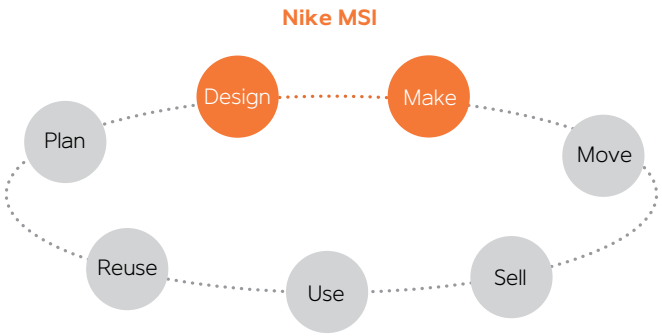
Introduction

We live in a resource-constrained world with an increasing population. At Nike, focusing on materials has led to product innovations that deliver superior performance and reduce our environmental impact, as measured by the Nike Materials Sustainability Index (Nike MSI).[1] Materials represent an estimated 60 percent of the environmental impacts of our products, so selecting better materials at the beginning of the product creation process is an activity within our control and one of our biggest levers for change.

In 2003, we began developing Nike MSI to provide a practical method to help designers make informed, real-time decisions about the potential and various environmental impacts of material choices in the product creation process. Nike MSI calculates relative material scores for each of the more than 80,000 materials available to Nike product creation teams from 1,400 suppliers. These scores then feed into the Nike Apparel and Footwear Sustainability Indexes, helping designers to select materials with lower environmental impacts, as measured by Nike MSI.

It is important to note that Nike MSI is not intended to be a substitute for full life cycle assessment (LCA) studies nor does it provide footprint endpoint data. By design, it is a tool to engage designers in considering certain sustainability issues with regard to materials. It looks only at the impacts of materials from "cradle to gate." The cradle-to-gate life cycle spans the origin of raw materials to a finished textile or component part, ready to be shipped to a product manufacturing facility. Nike MSI influences the "design" and "make" phases of the product life cycle, as shown in Figure 1, but does not include consumer "use" or end-of-life "reuse" phases. These may be included in the future as the research community develops additional data.

Figure 1. Nike Materials Sustainability Index (Nike MSI) influences the "design" and "make" phases of the product life cycle.



Because environmentally good materials can be supplied by environmentally poor-performing suppliers—and vice versa—Nike MSI provides a balanced approach to material impact evaluation that rewards good materials from good suppliers with the highest possible scores.

[1] *Nike, Inc. FY10/11 Sustainable Business Performance Summary*

Nike MSI balances scoring based on the following principles:

- Using three categories of points—a Base Material Score, Material Environmental Attributes and Supplier Practices—to achieve a robust scoring framework that delivers comprehensive materials assessments. A maximum of 100 points is possible, with higher scores indicating more sustainable materials.
- Evenly weighting four environmental impact areas across the Nike MSI scoring framework:
    - Chemistry
    - Energy and Greenhouse Gas (GHG) Intensity
    - Water and Land Use Intensity
    - Physical Waste

The Base Material Score examines publicly disclosed LCA studies, industry reports and supplier-derived information to assess the four impact areas and calculate a score for each raw material using a supply chain most representative of Nike's sourcing practices. We used common industry scenarios for materials that Nike typically does not use.

Material Environmental Attributes and Supplier Practices use indicators to supplement the Base Material Score, helping to compensate for gaps and weaknesses in LCA or supply chain data.

Material Environmental Attributes reward a finished material for Green Chemistry, Recycled and Organic content, and Water Conservation. Blending or Compositing two or more materials reduces a score.

Supplier Practices reward best practices within a specific supply chain, practices that cannot be accounted for in the representative Base Material Score. It looks at testing performance in Nike's Restricted Substance List (RSL) Program, Water Program, and Energy and Carbon Program, as well as voluntary participation in third-party Sustainability Certifications & Programs. Negative points penalize suppliers who fail to comply with basic environmental standards.

Combining the Base Material Score with points for Material Environmental Attributes and Supplier Practices provides an overall score unique to the finished material and supplier combination. Table 1 presents a high-level overview of Nike MSI's scoring framework.

Table 1. Nike Materials Sustainability Index Scoring Framework

	MAX POINTS
Base Material Score	**50**
Material Environmental Attributes	**24**
Supplier Practices	**26**
	100 TOTAL

We implemented Nike MSI into our product creation process in early 2011, and we have scored materials for five seasons to date. As a result of both group trainings and individual consultations, reporting for the Holiday 2013 product season shows that Nike MSI scores for Supplier Practices have increased, on average, by 1.2 points for Footwear and 2.1 points for Apparel over Fall 2013 results. Some suppliers have even made 10- to 15-point improvements, a very significant increase given the 26-point allocation for Supplier Practices. This is a great indication that our approach to reducing the environmental impacts of our products, as measured by Nike MSI, by driving improvements in the supply chain is working.

With Nike MSI's public release, we also plan to populate a "federated" wiki with our materials data, sources, algorithms and documentation. As developed by Ward Cunningham, pioneering programmer of the original wiki software and advocate for open-source collaboration, a federated wiki enables a unified view of data and content from diverse owners. As more footwear and apparel companies have an opportunity to use, customize and share materials data, a federated wiki becomes another mechanism to promote data transparency and collaboration across our industry for systemic improvement.

By clarifying communication about Nike MSI's intended purpose, targeted users, phase of the product creation process influenced, limitations of the tool, and the structure of the scoring framework, this introduction addresses Critical Finding 1 from the Technical Review Committee.

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Nike MSI Scoring Framework

When we recognized the need for a materials assessment tool in 2003, no tool meeting our requirements was commercially available. Nike worked with Brown and Wilmanns Environmental, LLC, to develop Nike MSI using the best publicly disclosed information related to the environmental impacts of materials.

Nike MSI addresses significant environmental impacts of a wide range of processed materials, including textiles and component materials. Nike MSI outputs numeric scores on a 100-point scale, with a higher score representing better performance in the selected environmental impact areas. All materials are scored using the same environmental impact areas and scale to enable relative comparisons.

Nike MSI is not intended to be a substitute for full LCA assessments nor does it provide footprint endpoint data. We understand that Nike MSI's approach to weighting and assigning a single score does not conform to standard LCA methods. By design, Nike wishes to take into account factors that are not easily assessed via conventional LCA. As such, Nike MSI is LCA-inspired and rests, in part, on LCA-derived inventory data.

Determining Environmental Impact Areas

We initially considered about 20 environmental impact indicators, including standard LCA indicators such as acidification, global warming, eutrophication, and human and eco toxicity. We also considered other types of relevant indicators such as compostability, degradability, recyclability, land use changes and genetically modified organisms (GMOs). We decided not to include some of these indicators due to insufficient publicly available supporting data. Additionally, there is a lack of scientific consensus regarding some impacts, so they are not captured in traditional LCA methodology.

We therefore concentrated on the smallest number of issues that would still provide enough information for designers to make informed material choices. Current Nike MSI impact areas include Chemistry, Energy and GHG Intensity, Water and Land Use Intensity, and Physical Waste.

For more information about the business and sustainability objectives that guided the development of Nike MSI, see the attached file NikeMSI_Objectives.pdf.

Weighting Environmental Impact Areas

We also wrestled with tough questions regarding environmental trade-offs. For example, how should we evaluate the impacts of Water Intensity compared with GHG Intensity or Carcinogenicity? Our Sustainable Business & Innovation team determined that there is no industry or scientific consensus regarding the relative weighting of specific environmental impact issues. For this reason, Nike MSI balances point allocations for Material Environmental Attributes and Supplier Practices against the Base Material Scores derived from science-based research and analysis to ensure that each impact area is weighted equally, with each contributing 25 percent of the total possible points.

Material Environmental Attributes and Supplier Practices are well-defined areas that provide differentiation between specific material and supplier combinations. We believe that incorporating these categories of points in Nike MSI is critical to achieving a robust scoring framework that looks at the entire materials ecosystem.

The Technical Review Committee expressed concern about the possibility of "double counting" indicators as a result of using these three categories of points. However, we are not attempting to calculate accurate endpoint impacts. For example, we chose to allocate more points to Recycled and Organic content because these indicators guide designers and suppliers in choosing materials with higher Nike MSI scores, and double counting does not change the direction of that guidance.

Table 2 illustrates how our four impact areas are balanced across the three categories of points.

The Technical Review Committee recognized that Chemistry analysis is one area where there is little consensus on the best method of evaluation (Critical Finding 8). This finding validates our decision to apply the least weight to Chemistry (9 points) for the Base Material Score and to allocate the remaining 16 points to specific indicators for Material Environmental Attributes and Supplier Practices. These are areas where there are proven, long-term industry activities that reduce the impact of Chemistry

In response to Technical Review Committee feedback, Critical Finding 3, we simplified this description of the Nike MSI scoring framework to enhance comprehension and usability.

Table 2. Nike Materials Sustainability Index Scoring Structure & Environmental Impact Weighting

	BASE MATERIAL SCORE	+	MATERIAL ENVIRONMENTAL ATTRIBUTES			+	SUPPLIER PRACTICES				=	NIKE MSI SCORE
			Green Chemistry	Recycled Content	Organic Content		RSL	Water Quality & Conservation	Energy and Carbon	Sustainability Certifications & Programs		Balanced Weighting
Chemistry	9	+	7		2.5	+	5			1.5	=	25
Energy and Greenhouse Gas (GHG) Intensity	11	+		6	2.5	+			4	1.5	=	25
Water and Land Use Intensity	13	+				+		10		2	=	25
Physical Waste	17	+		6		+				2	=	25
TOTAL	50		7	12	5		5	10	4	7		100

Base Material Scores

Each material is assigned a Base Material Score resulting from an evaluation of our four environmental impact areas—Chemistry, Energy and GHG Intensity, Water and Land Use Intensity, and Physical Waste—using a representative supply chain.

The supply chain assumptions embedded in Nike MSI reflect our actual material sourcing to the extent possible. In some cases, we evaluated multiple source locations and process scenarios to arrive at a representative profile for a material. Other apparel and footwear brands likely have similar supply chains; however, we structured Base Material Scores to accommodate more supply chain scenarios in the future if more data becomes available.

Nike MSI compiles and scores data for 13 individual indicators within the four impact areas, as shown in Table 3. Consistent with feedback from the Technical Review Committee (Critical Finding 2), we have removed materials that relied on proprietary data.[2] We have also updated and validated data in light of committee suggestions, and expanded annotations of data and sources to make data even more transparent for the benefit of all. We also compare old and new scores, show what has changed and analyze drivers of the changes.[3]

To reward incremental improvement, we eliminated step functions, which bucketed data to produce scores within upper and lower limits, based on feedback from the Technical Review Committee and life cycle expert Greg Norris (see page 32).

Table 3. Base Material Score Framework

IMPACT AREA	INDICATOR	MAX POINTS
Chemistry	Carcinogenicity	2.5
	Acute Toxicity	2.5
	Chronic Toxicity	2.5
	Reproductive Toxicity and Endocrine Disruption	1.4
	Subtotal	**9**
Energy and Greenhouse Gas (GHG) Intensity	Energy Intensity	4.4
	GHG Intensity	6.6
	Subtotal	**11**
Water and Land Use Intensity	Water Intensity	9.4
	Land Use Intensity	3.6
	Subtotal	**13**
Physical Waste	Hazardous	6.8
	Municipal Solid Waste	4.3
	Industrial	3.4
	Recyclable/Compostable	1.7
	Mineral	0.9
	Subtotal	**17**
	-10 -5 0 5 10 15 20 25 30 35 40 45 50	**50 TOTAL**

Note: Subtotals for Chemistry and Physical Waste have been rounded to a whole number.

[2] *For a few materials, we include process data from suppliers but do not identify the company at their request.*

[3] *See NikeMSI_BaseMaterialScoreData_2012_0724.xlsm and NikeMSI_Score_Comparison_2012_0710.xlsx*

We now use a mathematical function to transform Energy and GHG Intensity, Water and Land Use Intensity, and Physical Waste data into a percentile score for each indicator.

Because data generally skews towards lower values rather than following a typical bell-shaped distribution, we fit a function to the individual indicator data for the evaluated materials so that *lower* Energy Intensity, GHG Intensity, Water Intensity and Physical Waste values always result in a higher score. The function is adjusted so that *higher* Land Use Intensity values result in a higher score.

Plotted as a graph (data value against score), the results for these indicators generally follow an exponentially decreasing curve (except Land Use Intensity, which is increasing). In some cases, materials with extreme outlier values are assigned the minimum or maximum score for the indicator rather than being incorporated into the function, which helps maintain a reasonable separation between the scores of the majority of remaining materials. If the extreme outliers were included in the function, they would tend to cause scores associated with disparate data values to cluster together.

Life Cycle Scope

Each Base Material Score is derived using life cycle inventory (LCI) information that tracks material impacts for each indicator from "cradle to gate." The cradle-to-gate life cycle spans the origin of raw materials, raw material processing and pre-manufacturing, material manufacturing and post-manufacture processing. The cradle-to-gate life cycle is divided into two phases. See Table 4 for a summary.

- **Phase 1: Farm, forest or wellhead to an intermediate stage.** For most textiles, the intermediate stage is characterized as a cone of yarn. For leather, it is a salted raw hide. The intermediate stage for component parts is generally defined as a material ready to be processed into a sub-assembly or finished part. For example, the intermediate stage for polyurethane foam is the polyol and isocyanate ready to be mixed and foamed into a footwear midsole at a product assembly facility.

- **Phase 2: The intermediate stage to the finished textile or component part**. This includes the manufacture of greige goods as well as dyeing and finishing. For components, the second phase is typically the process that gives a material its physical state, such as foaming, coating or vulcanizing.

Table 4. Cradle–to–Gate Life Cycle

	STAGE	TEXTILE MATERIALS	COMPONENT MATERIALS
Phase 1	Raw Material Source	Farm, Forest, Wellhead, Other Sources	Farm, Forest, Wellhead, Other Sources
	Raw Material Processing	Processing into Fiber	Refining, Milling, Chipping, Pulping, Smelting, Other Processes
	Material Pre-Manufacturing	Yarn Spinning	Polymerization, Ingot, Sheet, Paper and Board Making, Other Processes
Phase 2	Material Manufacturing	Greige Goods Production	Casting, Stamping, Foaming, Molding, Vulcanizing, Box Making, Other Manufacturing Processes
	Material Post-Manufacturing	Dyeing and Finishing	Anodizing, Calendaring, Coating, Other Manufacturing Processes

Nike MSI examines Chemistry, Energy and GHG Intensity, Water Intensity and Physical Waste across the entire cradle-to-gate life cycle. Land Use Intensity focuses solely on the origin of a raw material in Phase 1 and does not consider land use elsewhere in the material life cycle.

Life Cycle Data

Nike MSI evaluates both naturally sourced (plant-, animal- or mineral-based) and synthetic (fossil–fuel-based) textiles and component part materials. When we started to build the material evaluation structure for Nike MSI, little or no standardized environmental data was available for many of the materials used in Nike products, especially data on the full supply chain. For some materials, details about the supply chain may be well characterized. For other materials, little is known about specific aspects of the supply chain or about specific suppliers' environmental performance, and the material is characterized generically.

The functional unit in all cases is one kilogram of the finished textile or component part material. This is because materials can be used in a variety of apparel and footwear products as well as in different applications for those products. Designers don't know the specific amount of a material required for a product until the design is complete. We account for material weight in design tools at the finished-product-level using material utilization metrics.

Data Analysis

Because primary data does not always exist for each material, we enlist multiple data sources to convert the information into functional units. All data sources are cataloged in Tier 3 data, accessed from page 22.

We use peer-reviewed, publicly available data when obtainable. We examine data relevance, applicability to the process stages[4] evaluated in Nike MSI and general data integrity. We also compare multiple data sources when possible for overall data consistency and reliability, in the following order of preference:

Literature review. For generic materials, we conduct a literature review to identify LCI data. It is rare that data is presented in a form that allows direct use with the functional unit of one kilogram of finished textile or component material. Conventional LCI data is usually associated with individual process stages or multi-stage modules that relate to a portion of the life cycle (for example, wellhead to polymer pellet or on-farm fiber production to ready-to-spin fiber). In situations where available data is applied across multiple process stages, the findings are used with data for other necessary process stages.

Published sources. When LCI data is unavailable, we use published studies where data can be converted into a functional unit (such as the average water requirement for a fiber crop and crop-yield data changed into liters of water per kilogram of finished textile). Published data from analogous materials considered similar in structure and production processes are also the basis for calculations—such as use of chicken LCI data for process stages applicable to goose down or use of polyethylene data for ethylene vinyl acetate (EVA).

[4] *Process stages refer to activities grouped by life cycle stage. For textiles, the process stages include farm/forest/wellhead, intermediate processing (ginning, pulping, refining, chemical production, etc.), yarn spinning, greige, dyeing and finishing—with transportation where applicable. Component stages include farm/forest/wellhead, intermediate processing and final processing (mixing, foaming, vulcanization, injection molding, etc.).*

Data management. Because of the variability in processes associated with textiles and component materials, ranges of data may be all that are available. In these cases, we use midpoints. Ancillary data regarding electricity grids, such as GHG Intensity factors, come from primary sources if available or secondary sources otherwise. Primary sources include government and/or utilities data assembled by the World Resources Institute for the GHG Protocol.

Professional experience. Where LCI data is not available for either the material under evaluation or a suitable analogous material, we have made estimates based on our professional experience and judgment. For example, Physical Waste data is generally not available in published LCIs, except for polymer Eco-Profiles available through PlasticsEurope and from suppliers. Consequently, for all other materials, we created estimates for each of the five Physical Waste indicators—high, moderately high, moderately low, low and none. To determine scores for these materials, they are mapped to the curve formed by materials with actual waste data. In addition, we estimate for loss rates across the life cycle of each material where applicable based on literature reviews or professional judgment. All estimates serve as placeholders until more data becomes available.

Supplier data. For some materials, we obtain supplier-specific data via a questionnaire. Supplier questionnaire data is mostly limited to specific process stages representing only a portion of the overall cradle-to-gate life cycle, typically the end-stage manufacture of the material. Generally, supplier questionnaire data is integrated with secondary generic information. The data is used "as is" and is not subject to additional validation.

Calculations and Data Assumptions

Nike MSI worksheets are a modified version of a process flow chart. The process flow starts at the origin of raw materials (farm, forest or wellhead) and continues through up to 11 processes, with each process specified if used. The structure is flexible to accommodate a wide range of materials, from textiles to foams. Some materials start with pellet, polymer, fiber or foam rather than with the origin of raw materials, and a small number of materials require additional calculations on separate worksheets (for example, leather).

All inputs and outputs under consideration are allocated to the material. Where co-products with significant economic value exist, such as cotton and cottonseed, we generally use allocation by weight. We use economic values in some instances where weight would be irrelevant. Waste that is disposed of does not receive an allocation.

When available, loss and waste values are incorporated into individual process steps along the material life cycle stages; otherwise, we make estimates based on overall loss rates. Material loss varies significantly for bio-based materials; for example, 40 to 50 percent of seed cotton ends up as lint, and 10 to 15 percent of the hemp harvest is apparel textile grade.[5] Losses that occur along the process flow are accounted for by an increase in the required mass of raw materials and intermediates sufficient to create a kilogram of finished material.

[5] *See the attached file NikeMSI_BaseMaterialScoreData_2012_0724.xlsm*

Calculations for Energy, GHG and Water Intensity follow typical LCI conventions for processes. For example, to determine Water Intensity, we take the water requirement for a given crop, subtract average rainfall in the geographic region and assume the remaining requirement is met by irrigation.

Critical Finding 7 from the Technical Review Committee sought to clarify the use of proxy data in Nike MSI. We employ proxies or available process data for materials lacking LCA data to calculate use of water, etc., so we do not have to eliminate these materials from the tool. Proxy materials use similar processes and/or chemistry. For example, EVA uses the Eco-Profile data for polyethylene.

In general, we derive process energy and water for yarn and textiles from estimates in a study conducted for a Danish EPA report on the environmental impacts of textiles. Since the data is variable depending on technology and expertise, we took the averages of the given ranges. We did not attempt to define low-input versions of yarn or textile manufacturing.

Chemistry

The Chemistry algorithm assesses significant chemical substances across the cradle-to-gate life cycle. For polymers, significant chemical substances are those substances present in the principal reactions, including known catalysts, from the raw material source through polymer formation. For bio-based agricultural materials, significant chemical substances are the typical pesticides used in cultivation. For yarn and textile processes, we define them as the typical minimum processing chemistry at each manufacturing stage.[6]

Chemistry combines human health hazard evaluations for Carcinogenicity, Acute Toxicity, Chronic Toxicity, and combined Reproductive Toxicity and Endocrine Disruption with assumptions about potential exposures during the life cycle. We do not evaluate eco-toxicity, as we do not consider the data to be of sufficient value for making business decisions given the added complexity, cost and time required to gather and analyze the data.

Chemistry is evaluated in two phases for each material:

- For most textiles, Phase 1 spans the origin of raw materials to a cone of yarn. Phase 2 spans greige fabric through finished textile.
- For components, such as molded parts, foams and buttons, Phase 1 spans the origin of raw materials to the formation of the basic material (e.g., polymer pellets). Phase 2 covers additional processes that transform the basic material into the materials that are shipped to an assembly facility (e.g., processing pellets into a foam).

We calculate scores for the two phases independently and then average them to derive an overall score. There is a greater likelihood for high-hazard materials to be present in Phase 1 (such as the use of pesticides in agriculture and benzene, phosgene and toluene in polymer production) compared to Phase 2 (with the use of dyestuffs and auxiliaries in dyeing, and water or carbon dioxide in foam blowing). Nike uses two phases to ensure that the Chemistry impacts of Phase 1 do not totally

[6] *See the attached file NikeMSI_BaseMaterialScoreData_2012_0724.xlsm for the specific chemistries associated with each material.*

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overshadow the Chemistry of Phase 2 and to provide visibility into areas where we can seek improvement.

Chemistry impacts are summarized in Figure 2. For a complete overview of Chemistry scoring, including hazards, exposure assumptions and the methodology used to evaluate significant substances, see the attached file NikeMSI_Chemisty.pdf.

Figure 2.1. Carcinogenicity Histogram

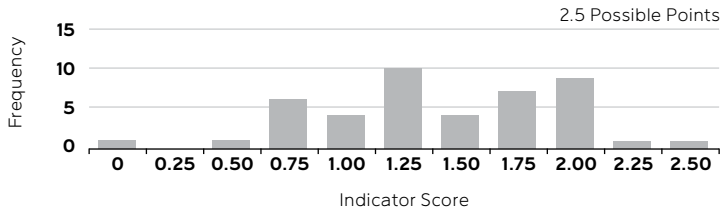


Figure 2.2. Acute Toxicity Histogram

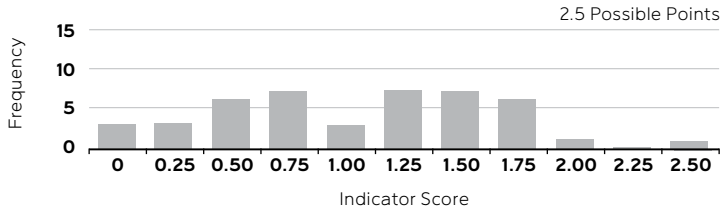


Figure 2.3. Chronic Toxicity Histogram

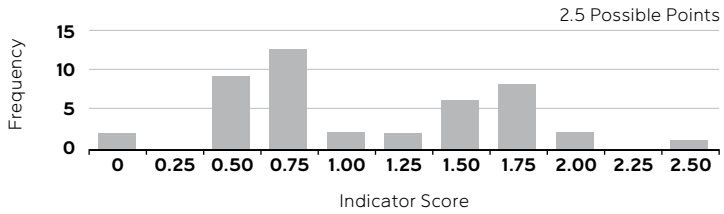
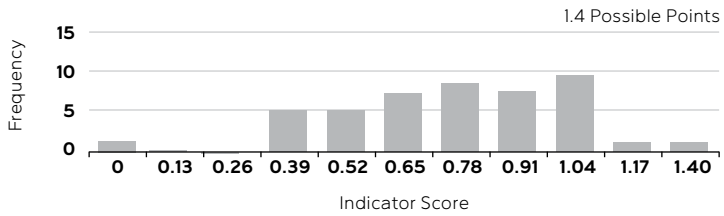


Figure 2.4. Reproductive Toxicity and Endocrine Disruption Histogram



The current procedure for assessing Chemistry strikes a balance between conventional risk assessment and a hazard-only approach to material review. However, we agree with the Technical Review Committee's suggestion (Critical Finding 8) to migrate the Chemistry assessment to a widely accepted methodology when one is created.

Because of the lack of consensus around a standard methodology for assessing Chemistry, this impact area receives the lowest weighting in the Base Materials Scores.

Energy and GHG Intensity

Energy Intensity includes primary process energy plus transportation where data is available. In response to Critical Finding 4 from the Technical Review Committee, we have included feedstock (caloric value) energy.

We do not include the Energy and GHG Intensity embodied in significant chemical substances or capital equipment. Nike does not consider the data to be of sufficient value for making business decisions given the added complexity, cost and time required to gather and analyze the data.

We calculate GHG Intensity with commonly used GHG Protocol[7] methods and emission factors where possible. For transportation-related GHG Intensity, we consider Scope 1, direct emission. We use Scope 2, indirect emission, for electricity; but in the case of most textile-related processes, we used a mix of electrical and thermal energy data sources. For GHG Intensity related to thermal processes, we used the Scope 1, direct emission—fuel oil or natural gas for water heating, etc. We make assumptions about the split between electric and thermal energy when general data is available; for example, megajoules (MJ) for a process without identifying the source of the MJ. Assumptions for electric and thermal are roughly based on the use of either diesel-driven machinery (farm equipment) or heating use (dyeing and drying) in a process.

Indicator scoring for Energy and GHG Intensity is summarized in Figure 3.

Figure 3.1 Energy Intensity

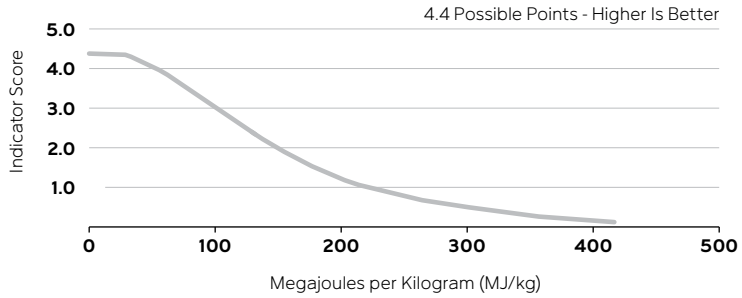
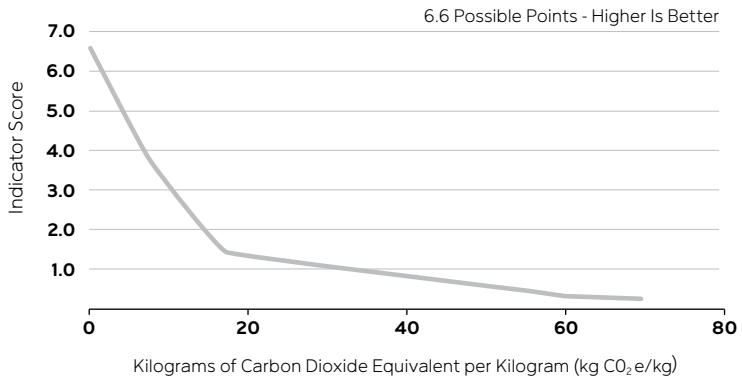


Figure 3.2 Greenhouse Gas Intensity



[7] *See www.ghgprotocol.org.*

Water and Land Use Intensity

Water Intensity includes primary process water, such as irrigation for agricultural crops, but does not include water used in transportation. Where PlasticsEurope Eco-Profile[8] data is used, water includes cooling water.

Rainfall is not included in the water calculations for agricultural crops, nor is the water embodied in significant chemical substances or capital equipment. Nike does not consider the data to be of sufficient value for making a business decision given the added complexity, cost and time required to gather and analyze the data.

Land Use Intensity is the amount of bio-based raw material produced per hectare of land. Distinctions between renewable and natural fibers appear in Land Use Intensity, as producing bio-materials requires significant land resources.

We could not identify an appropriate method for calculating the amount of fossil–fuel-based raw material per hectare. Neither could we address the potential displacement of food production. We therefore decided to maximize fossil–fuel-based land-use footprints by assigning a zero score, which implies a tremendous land footprint based on use of a finite resource. Likewise, inorganic materials that use extractive processes (such as mineral filler) also receive a zero score.

Indicator scoring for Water and Land Use Intensity is summarized in Figure 4.

Figure 4.1 Water Intensity

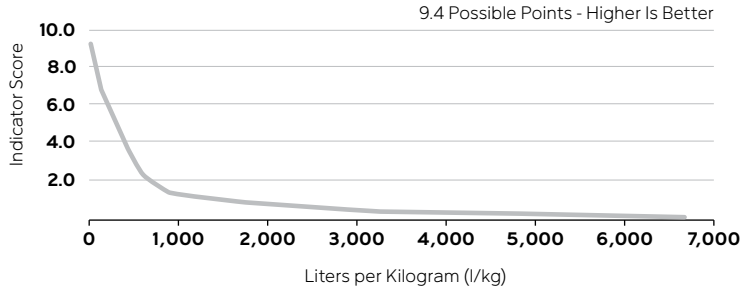
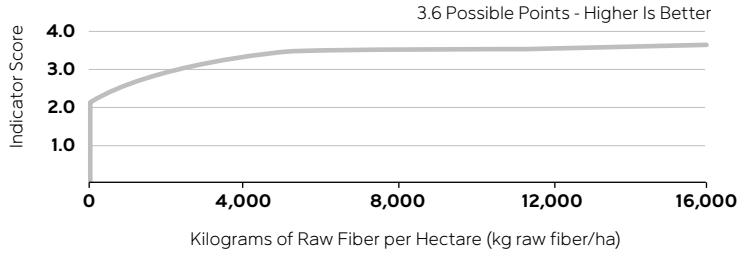


Figure 4.2 Land Use Intensity



Note: By default, non-renewable resources receive a zero score.

[8] *For more information, visit: www.plasticseurope.org/plastics-sustainability/life-cycle-thinking.aspx*

Physical Waste

Physical Waste is the waste generated from cradle-to-gate, based on aggregating the European Union waste categories used in Eco-Profiles. Eco-Profile data is available for commonly used fossil–fuel-based fibers and a limited number of bio-based fibers. Physical Waste is divided into the following categories: Hazardous, Municipal Solid Waste, Industrial, Recyclable/Compostable and Mineral.

Nike recognizes that Physical Waste is neither a typical impact nor an inventory category in many LCA methodologies. In business settings, however, waste is a critical business metric and has a variety of cost and management implications. Although there are significant differences in environmental impact depending on whether waste is placed in a landfill, incinerated for energy recovery, composted for beneficial use or recycled into new product, focusing on Physical Waste reinforces a policy of driving towards zero-waste products. Our goal is to eliminate waste wherever possible across the cradle-to-gate life cycle, regardless of how it might be managed after it is created.

Nike is interested in encouraging closed-loop systems; Industrial and Recyclable/Compostable waste streams may help address closed-loop systems. Quantities of both Municipal Waste (much of which may be recycled after collection) and Mineral Waste (associated with energy production) are so large that they would overwhelm other categories, hence the decision to keep them separate.

Because Physical Waste data is not available for most bio-based materials, even when LCA data is identified, we have made estimates. These estimates are based on broad assumptions regarding the types of waste likely produced during each process stage and represent placeholders until an alternative method for estimating waste by type can be developed.

Nike MSI accounts for spinning and weaving impacts and the losses associated with these processes. Losses are accounted for, and where appropriate allocated, throughout the supply chain.

Indicator scoring for Physical Waste is summarized in Figure 5. Only synthetic materials, for which there is quantitative waste data, are included in the indicator summary graphs.

Figure 5.1. Hazardous Waste

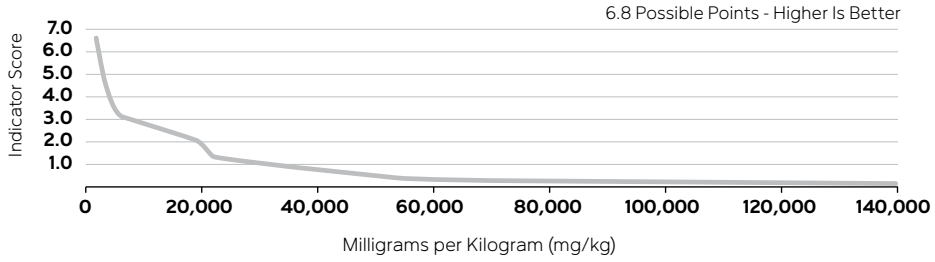


Figure 5.2. Municipal Solid Waste

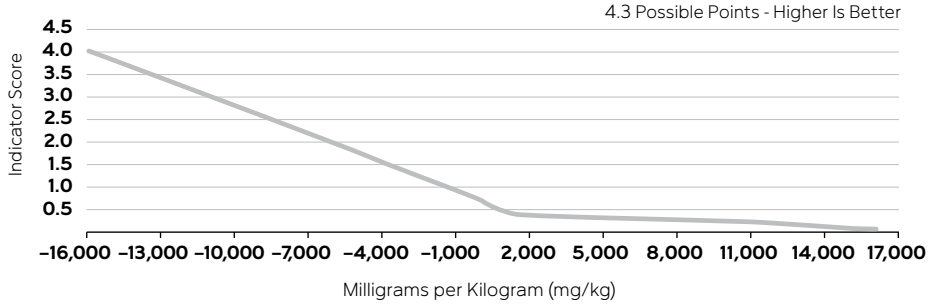


Figure 5.3. Industrial Waste

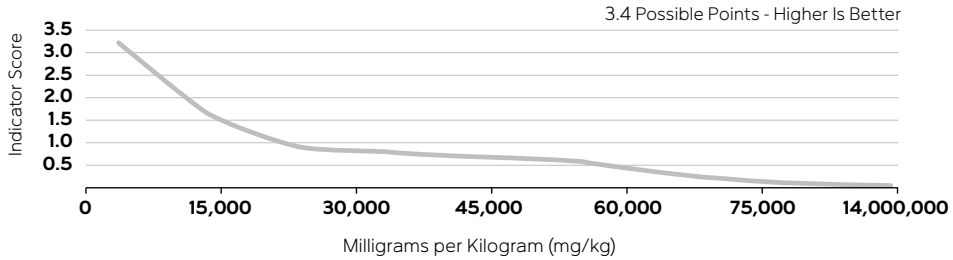


Figure 5.4. Recyclable/Compostable Waste

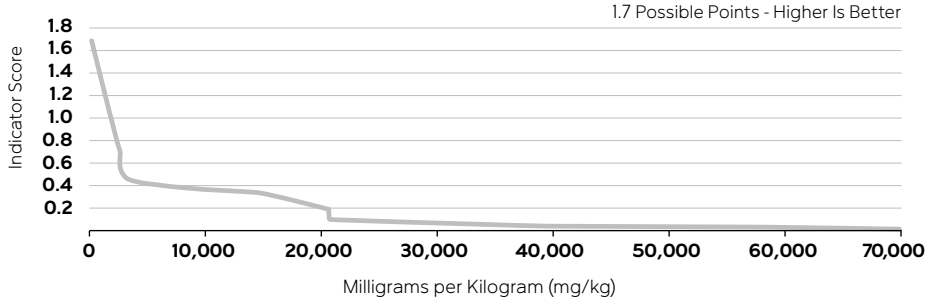
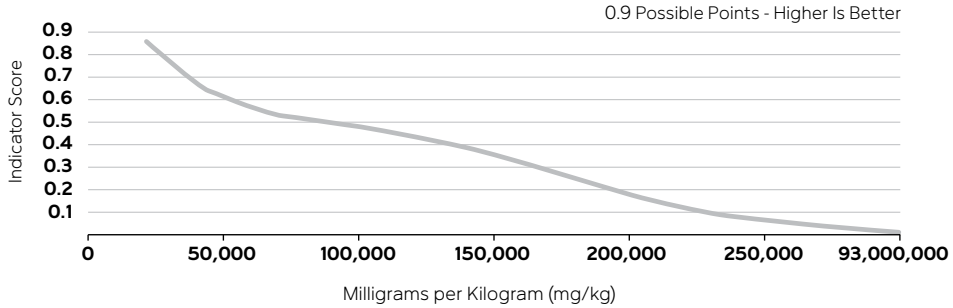


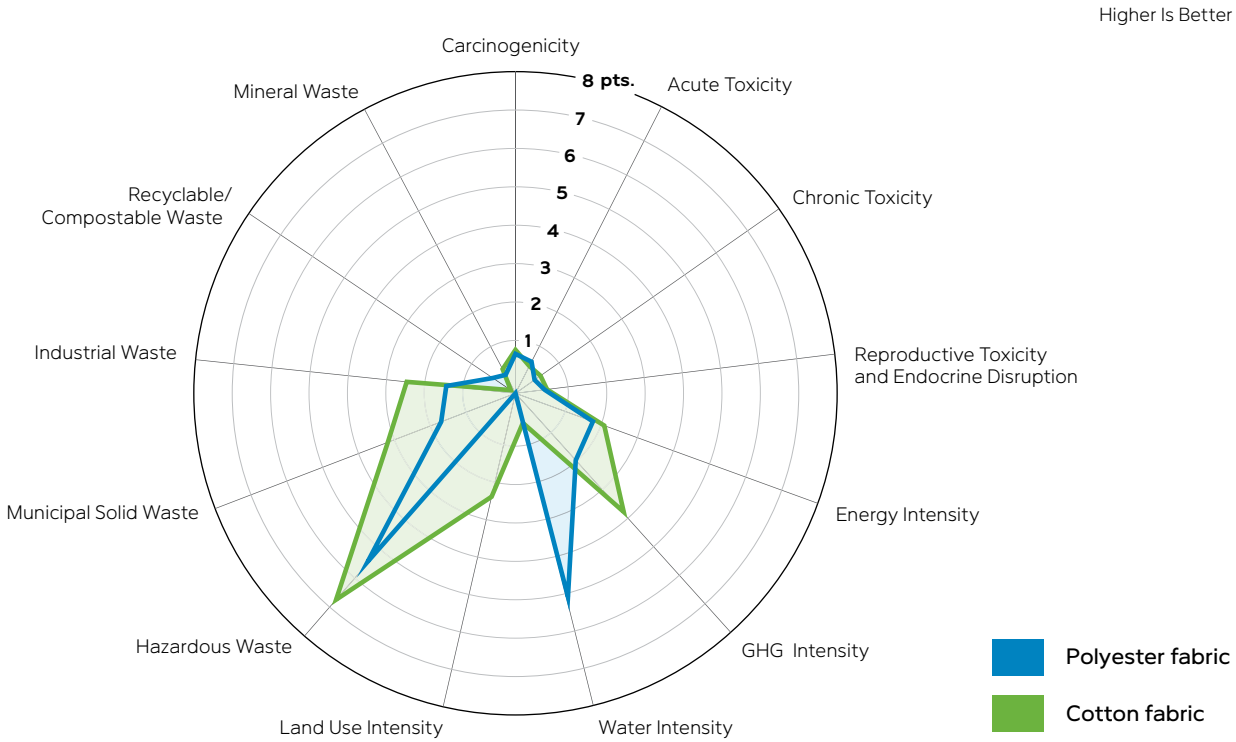
Figure 5.5. Mineral Waste



Environmental Trade-offs

Because there are always environmental trade-offs when making material choices, it is important to review and weigh each impact area when making a decision. For example, while one material may have lower Energy and GHG Intensity compared to another, this same material may have higher Water Intensity. In response to Technical Review Committee feedback (Critical Finding 6), we will use a federated wiki to show graphical representations of the impact areas, allowing users to assess the environmental trade-offs between two or more materials. An example is shown in Figure 6.

Figure 6. Comparison of Environmental Trade-offs between Cotton and Polyester.



How to Access Attached Files

Access a file by double-clicking on the file name in the directory of files at the bottom of the Acrobat document window.

To open or collapse the directory of files, click on the paperclip icon in the bottom left corner of the Acrobat document window.

Nike MSI Tiered Data

The data, algorithms, assumptions and frameworks for calculating Base Material Scores are divided into three tiers. Tiers 1 and 2 are report views of Tier 3, which contains all source information. We updated and validated data in response to Technical Review Committee suggestions, and we expanded annotations of data and sources to make information even more transparent for the benefit of all.

Tier 1. Provides the clearest view of Base Material Scores, with sufficient detail to provide a working understanding of the scoring framework. Includes high-level summary impacts of Chemistry, Energy and GHG Intensity, Water and Land Use Intensity, and Physical Waste for about 45 materials, listed in alphabetical order.

Tier 2. Provides comprehensive results for each material, presented in a single table with detailed explanations of supply chain assumptions, summary indicator values and detailed scoring. Tier 2 provides the materials and life cycle practitioner with sufficient information to understand Nike MSI.

Tier 3. Includes Nike MSI source data, algorithms and assumptions, and is the information source for Tiers 1 and 2. Tier 3 provides transparency into Nike MSI and is where to add new materials, provide better data and develop alternative supply chain scenarios.

Tier 1 and Tier 2 Static Files

The static Tier 1 and Tier 2 files report only values; we removed all calculations and linked data. Get started by reviewing this file for an overview of how Nike MSI data is organized.

NikeMSI_Tier1Data_2012_0724.xls
NikeMSI_Tier2Data_2012_0724.xls

Tier 3 Dynamic File

Please read the instructions before opening the dynamic Tier 3 file. It provides a comprehensive description of how to add new materials and edit the spreadsheet.

NikeMSI_Instructions_2012_0708.pdf
NikeMSI_BaseMaterialScoreData_2012_0724.xlsm

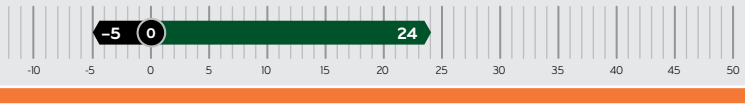
Material Environmental Attributes

Points for Material Environmental Attributes reward a finished material for incorporating Green Chemistry, Recycled and Organic content, and Water Conservation. Blending or Compositing two or more materials reduce a score to account for the additional resources required for manufacture and the effect on recycling at product end of life. Negative points penalize suppliers who fail to meet these basic environmental standards.

Nike MSI uses points for Material Environmental Attributes to compensate for data gaps and weaknesses in LCA or supply chain data while also embedding Nike's sustainability goals into the scoring structure. For product creation teams, the goal is to choose materials with higher overall Nike MSI scores; balancing the Base Material Score with points for Material Environmental Attributes and Supplier Practices across the ecosystem provides decision makers with different approaches to drive a higher score.

Table 5 provides a summary overview of the scoring framework for Material Environmental Attributes. Points are awarded on a tiered basis as described in Table 6.

Table 5. Material Environmental Attributes Framework

POINTS	MIN	MAX
Nike Green Chemistry Program Validation - Material Greening Effort[a]	0	7
Water Conservation Option 1 - Dye Method[b]	0	0 or 5
Recycled Content	0.0	12.0
Organic Content	0.0	5.0
Blends and Composites	-5	0
		24 TOTAL

[a] Must participate in "Nike Green Chemistry Program Commitment" and achieve a "0" score before points can be gained through "Nike Green Chemistry Program Validation."
[b] Suppliers are awarded Water Conservation points at the Supplier or the Material level, but not both.

Nike Green Chemistry Program

The goal of the Nike Green Chemistry program is to systematically and proactively reduce toxic chemicals in materials and processes.

- Represents work toward a systematic, risk-based (hazard and exposure) approach to assessing toxic chemicals in a material or process.
- Assesses potential exposure of consumers, factory workers and the environment to harmful chemicals in order to prioritize the elimination of those chemicals (through reformulation or control via an RSL program) that pose the greatest risk.
- Awards points for evaluating chemical use within a supplier facility and for using processes and technologies that reduce or eliminate toxic chemicals in materials production.

Water Conservation

Promotes the reuse and recycling of wet processing water for textile manufacturing.

- Provides incentives to use water-efficient process alternatives and to develop waterless processes for textiles.
- Material-level points are earned by using a water-efficient or waterless wet processing method to color and/or finish the textile.
- Suppliers earn points through water reuse and recycling.

Recycled and Organic Content

These Material Environmental Attributes represent reduced resource inputs—Chemistry, Energy and Greenhouse Gas (GHG) Intensity, Water and Land Use Intensity, or Physical Waste—and therefore a lower environmental impact for the material.

- Provides incentives for using Recycled and Organic content in materials and product.
- Awards points based on the percentage of Recycled or Organic material used in the material.

Blends and Composites

This is a finished–material-specific method of accounting for the resource impacts—Chemistry, Energy and GHG Intensity, Water and Land Use Intensity, or Physical Waste—of combining two or more raw materials into a finished material. The indicator also addresses end-of-life disposition of the post-industrial and post-consumer waste, as blending typically limits recyclability.

- Deducts points from the total finished material score based on a blend of two or more fibers or polymers.

Table 6. Material Environmental Attributes Indicator Scores

METRIC	PTS.	SCORING CRITERIA				
Nike Green Chemistry Program Validation Material Greening Effort	**7**	4 Incremental improvement in material greening effort validated by Nike	7 Best in class. Material greening effort evaluated by Nike			
Water Conservation Dye Method	**0** or **5**	0 No alternative coloration	3 Reduced water coloration	5 Waterless coloration		
Recycled Content	**12**	0.0 → 12.0 No recycled content → 100% recycled content				
Organic Content	**5**	0.0 → 5.0 No organic content → 100% organic content				
Blends and Composites	**0**	-5 Blend/composite of more than two fibers/polymers	-3 Blend of two fibers/polymers	0 Single fiber/polymer		
	24	Maximum Points for Material Environmental Attributes				

Nike's North Star Sustainability Goals

HEALTHY CHEMISTRY. Minimize the impact of ingredients throughout the product life cycle. Protect workers, consumers and the environment.

CLOSING THE LOOP. Design for materials recovery or safe return to nature. Reduce materials consumption and increase recycling.

CLIMATE STABILITY. Provide leadership toward climate stability. Reduce energy consumption and use renewable energy sources.

WATER STEWARDSHIP. Borrow water responsibly and return it clean to communities. Reduce water consumption and improve water quality.

THRIVING COMMUNITIES. Enable all stakeholders along the value chain to meet their needs and lead fulfilling lives.

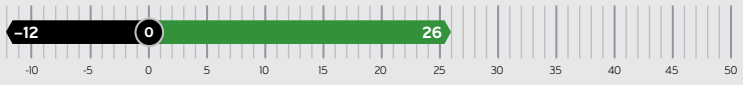
GAME CHANGERS. Educate, challenge and empower others to join the sustainability journey.

Supplier Practices

Points for Supplier Practices reward best practices in a specific supply chain scenario, practices that cannot be accounted for in the representative Base Material Score. It uses testing performance in Nike's RSL Program, Water Program, Energy and Carbon Program, as well as voluntary participation in Sustainability Certifications & Programs to score a supplier's environmental performance. Negative points penalize suppliers who fail to meet these basic environmental standards. Table 7 provides an overview of the scoring framework for Supplier Practices. See Table 8 on page 27 for a detailed summary.

Obviously, we recognize performance in Nike-based programs when scoring our material suppliers. Many companies have similar in-house programs, and ideally an industry group will establish robust and transparent performance standards for these types of programs to ensure that equivalent programs could be used as well.

Table 7. Supplier Practices Framework

POINTS	MIN	MAX
Restricted Substance List Program	-5	5
Nike Green Chemistry Program Commitment - Self-Evaluation of Chemicals and Facility[a]	-2	0
Nike Water Program	-5	5
Water Conservation Option 2 - Supplier Facility Water Recycling[b]	0	5 or 0
Nike Energy and Carbon Program[b]	0	4
Sustainability Certifications and Programs	0	7
		26 TOTAL

[a] Must participate in "Nike Green Chemistry Program Commitment" and achieve a "0" score before points can be gained through "Nike Green Chemistry Program Validation."
[b] Suppliers are awarded Water Conservation points at the Supplier or the Material level, but not both.

RSL Program

- Educates suppliers about substances that are restricted for use in finished materials and products.
- Bases restrictions on the strictest global legislation related to chemical use. Specific brands or retailers may develop a program that voluntarily includes certain substances or limits.
- Awards points for performance against material test submissions and the supplier's ability to consistently supply materials that are RSL-compliant.

Nike Water Program

The goal of a water quality program is to promote the practice of borrowing water responsibly and returning it cleaner to communities.

- Collects data about water use and discharge in textile processing and assesses water-related supply chain and business risks.

- Assigns ratings that reflect the quality of wastewater discharge[9] at the facilities of material suppliers and their subcontractors.
- Awards points for program participation and for performance rating in water testing results against a program baseline.

Nike Energy and Carbon Program

Energy and carbon emissions are a critical element of the environmental impact of materials. We are in the early stages of developing an Energy and Carbon Program, which we anticipate will be implemented as part of the Nike MSI assessment process in 2013.

- Will use facility- and process-specific energy data to calculate energy and carbon key performance indicators (KPIs).
- Will assess supplier performance against the program using an Energy and Carbon Assessment Tool (ECAT) that is currently in development.

Sustainability Certifications & Programs

We encourage material suppliers to participate in sustainability programs and third-party certifications across a variety of environmental management systems and protocols. These programs and certifications are currently voluntary on the part of suppliers (with significant variability in participation) and serve as differentiators of best practice.

Nike does not view points awarded through these Sustainability Certifications & Programs as double counting because they require an additional level of effort in different areas of the supply chain.

Nike MSI tiers Sustainability Certifications & Programs based on the level of process rigor, effort, independence, transparency and performance thresholds, as summarized in Table 9.

[9] *The quality of wastewater is assessed by evaluating the pH, total suspended solids (TSS), biological oxygen demand (BOD), chemical oxygen demand (COD), color, foam, domestic sewage and wastewater treatment sludge.*

Table 8. Supplier Practices Indicator Scores

METRIC	PTS.	SCORING CRITERIA				
RSL Program	**5**	-5 **Black** No testing done	-3 **Red** < 80% pass rate for >0 tests	0 **Yellow** 80%-89% pass rate for >0 tests	3 **Blue** ≥ 90% pass rate for < 20 tests	5 **Green** ≥ 90% pass rate for ≥ 20 tests
Nike Green Chemistry Program Commitment Self-Evaluation of Chemicals and Facility	**0**	-2 No participation in Nike Green Chemistry Program	0 Signed commitment to self-evaluate all chemicals			
Nike Water Program	**5**	-5 **Black** Insufficient data or no response	-3 **Red** Needs improvement	0 Not rated	3 **Yellow**	5 **Green or Blue**
Water Conservation Supplier Facility Water Recycling	**5** or **0**	0 < 10% of water recycled	1 ≥ 10% of water recycled	3 10-49% of water recycled with documentation	5 ≥ 50% of water recycled with documentation	
Nike Energy and Carbon Program	**4**	1 Meets minimum energy management definition.	2 ECAT score of 2. Completed energy assessment.	3 ECAT score of 3. 5% improvement in energy KPIs.	4 ECAT score of 4. 10% improvement of energy KPIs.	
Sustainability Certifications & Programs	**7**	1 **Tier 3**		2 **Tier 2**		4 **Tier 1**
• Comprehensive Input Stream Management System		bluesign® screening phase		bluesign® implementation phase		bluesign® approved fabrics
• Organic Certification						OE 100 standard certified, OE blended standard certified, GOTS certified
• Recycled Certifications						SCS Recycled Content Certification, TE Global Recycle Standard certified, Intertek Management Systems Certification
• Nike Closed-Loop Material Program		Nike CLM participant		Nike CLM Finished Component - Internal waste recovery		Nike Zero Waste Material Process
• Sustainable Cotton Agriculture		BCI member				BCI member & buyer
• Content Claim Certification						TE Content Claim Standard
• Sustainable Leather Production		LWG Bronze rated		LWG Silver rated		LWG Gold rated
• Sustainable Forestry Certification						FSC Chain of Custody Certification
• Climate Change Transparency		CDP participant				
• Environmental Management Systems		ISO 14001 certified				
• Green Building Impacts		Silver LEED certified, Certified LEED		Platinum LEED certified, Gold LEED certified		
	26	Maximum Points for Supplier Practices				

Table 9. Criteria for Assessing Sustainability Certifications & Programs

	SCORING CRITERIA and POINTS			
	1		2	4
	Nike Programs	Membership Organizations	Third-Party Programs	Third-Party Certifications
CRITERIA	**TIER 3**	**TIER 3**	**TIER 2**	**TIER 1**
Transparency				
Publicly available criteria and application process. Translations provided on request.		X	X	X
Publicly available information regarding the standards development process.		X	X	X
Complaints Resolution				
Documented complaints resolution method for handling procedural complaints.				X
Criteria				
Clearly specified social, environmental, and/or economic objectives.	X	X	X	X
Does not favor a particular technology or patented item.	X	X	X	X
Based on objective, measurable performance standards, not membership dues or fees.				X
Requires practices that meet or exceed existing regulatory requirements.	X	X	X	X
Verification & Auditing				
Requires on-site visits before a certificate can be issued.				X
Requires annual renewal based on on-site visits or documentation review.				X
Certificates issued only upon complete fulfilment of program or certification criteria.	X	X	X	X
Uses independent certifying bodies.				X
Access				
All relevant participants, regardless of size or location, have equal opportunity to participate at a reasonable cost.	X	X	X	X
Participation in the program or certification is voluntary.	X	X	X	X

Scoring a Finished Material

Nike MSI calculates sustainability scores for finished materials available from specific suppliers as listed in our product data management system. Product and material developers access this system to select materials specific to their end-use product application. Nike MSI informs and accelerates the application of sustainable product design principles, helping internal product creation teams make better environmental choices for materials.

Nike MSI is integrated into the Nike Footwear and Apparel Sustainability Indexes, tools used internally for assessing the sustainability of the products we design. A given product will gain points based on progress toward environmental scoring targets, which we can then use as a benchmark for all future products.

Each product is made up of multiple finished materials, documented in a bill of materials (BOM), and each material has a Nike MSI score. The Nike Footwear and Apparel Sustainability Indexes pull the total calculated Nike MSI score for each material on the BOM as part of the total product score.

A finished material can be made up of one or more base raw materials. Nike MSI scores start with the Base Material Score for each raw material. We then weight each raw material based on percent content, apply the Blends and Composites deduction if appropriate, and add or subtract points for Material Environmental Attributes and Supplier Practices.

We implemented Nike MSI into our product creation process in early 2011, and we have scored materials for five seasons to date. We want to help our 1,400 suppliers succeed moving forward, so we conduct both group trainings and individual consultations each season. As a result, reporting for the Holiday 2013 product season shows that scores for Supplier Practices have increased, on average, by 1.2 points for Footwear and 2.1 points for Apparel over Fall 2013 product season results. Some suppliers' scores have even leapt by an impressive 10 to 15 points. This experience is a great indication that suppliers understand the strategic business importance of Nike MSI, are fully engaged and that our approach to reducing the environmental impacts of our products by driving improvements in the supply chain is working. In the process, other footwear and apparel brands benefit from innovative practices in the ecosystem.

Table 10 summarizes Base Material Scores and provides a high-level overview of the elements in a complete Nike MSI score. Table 11 illustrates scoring of four finished materials, including 100% virgin Polyester, 100% recycled Polyester, a blend of 50% Organic and 50% conventional Cotton, and 100% Styrene Butadiene Rubber.

Table 10. Nike Materials Sustainability Index Scoring Framework — 100 Points Possible – Higher Is Better

RAW MATERIAL	BETTER MATERIALS: Base Material Scores					BETTER MATERIALS: Material Environmental Attributes				BETTER SUPPLIERS: Supplier Practices					
		Chemistry	Energy and Greenhouse Gas Intensity	Water & Land Use Intensity	Physical Waste	Material Greening Effort[1]	Water Conservation: Dye[2]	Recycled Content	Organic Content	RSL Program	Self-Evaluation: Chem & Facility[1]	Nike Water Program	Water Conservation: Recycling[2]	Nike Energy & Carbon Program	Sustainability Cert. & Programs
Max Points	**50.0**	9	11	13	17	**24**	7	12	5	**26**	5	5	5	4	7
Acrylic fabric	**19.7**	2.8	2.9	4.3	9.7										
Aluminum	**22.7**	6.4	4.8	1.9	9.5										
Aramid fabric	**17.7**	2.8	2.5	1.4	10.9										
Carbon fiber	**15.4**	5.9	0.2	0.8	8.5										
Corrugated cardboard	**34.4**	2.3	9.4	12.5	10.1										
Cotton fabric	**26.8**	3.4	6.3	3.4	13.7										
Down	**38.2**	5.1	10.3	7.8	15.0										
Epoxy resin	**21.5**	4.5	5.6	3.9	7.6										
Ethylene-vinyl acetate (EVA) foam	**32.4**	4.3	8.2	8.1	11.8										
Glass fiber	**24.1**	0.8	9.8	7.2	6.3										
Hemp fabric	**25.1**	5.9	3.4	3.8	11.9										
Jute fabric	**19.6**	2.1	3.1	2.6	11.9										
Leather, corn-fed	**27.5**	1.7	7.2	4.2	14.3										
Leather, grass-fed	**32.8**	5.0	7.2	6.3	14.3										
Linen fabric	**23.7**	2.8	3.5	4.0	13.4										
Lyocell fabric	**25.3**	4.7	5.0	5.6	10.0										
Mineral filler	**30.0**	9.0	10.9	7.4	2.7										
Modal fabric	**21.3**	3.7	5.9	4.5	7.2										
Nylon-6 fabric	**16.3**	3.2	3.0	4.0	6.2										
Nylon-6,6 fabric	**18.6**	3.1	2.9	1.6	11.1										
Polycarbonate	**27.0**	6.1	6.3	6.5	8.0										
Polyester fabric	**23.3**	3.2	4.3	5.2	10.6										
Polyethylene foam	**34.4**	5.6	8.9	8.1	11.8										
Polylactic acid (PLA) fabric	**25.6**	3.2	6.4	8.4	7.5										
Polypropylene	**36.1**	6.0	9.3	8.2	12.6										
Polypropylene fabric	**32.6**	6.0	6.2	8.0	12.5										
Polyurethane TPU, with solvent	**22.6**	6.1	6.7	4.4	5.4										
Polyurethane TPU, without solvent	**22.9**	4.9	7.1	4.5	6.4										
Polyvinyl alcohol (PVA)	**34.5**	5.5	9.1	8.1	11.8										
Pulp, wood	**26.5**	6.0	8.0	10.5	2.0										
Ramie fabric	**23.0**	2.2	2.9	5.9	11.9										
Rayon-viscose fabric, bamboo	**18.9**	2.4	3.1	6.2	7.2										
Rayon-viscose fabric, wood	**18.0**	2.4	2.7	5.6	7.2										
Rubber, natural latex	**42.1**	5.4	10.5	12.2	14.0										
Rubber, polybutadiene (BR)	**25.7**	2.1	6.6	8.6	8.5										
Rubber, styrene butadiene (SBR)	**22.3**	1.8	8.0	7.0	5.6										
Silk fabric	**30.7**	6.7	1.7	6.9	15.4										
Spandex fabric	**13.7**	3.1	2.8	2.6	5.3										
Steel, carbon	**32.6**	6.4	10.0	7.8	8.4										
Steel, stainless	**29.4**	5.6	8.0	7.4	8.4										
Themoplastic polyurethane, bio-based	**26.9**	6.1	8.2	8.5	4.1										
Triexta fabric	**24.0**	1.9	4.2	8.3	9.6										
Wool fabric	**19.3**	1.9	1.7	3.2	12.6										
Zinc	**33.4**	5.3	8.7	5.3	14.1										

[1] Must achieve a "0" score for Material Greening Effort before points can be gained through Self-Evaluation: Chemicals & Facility.
[2] Points for "Water Conservation" are awarded at the Material or the Supplier level, but not both.

Note: Scores have been rounded to the tenths place.

Table 11. Nike Materials Sustainability Index Scoring Examples

100 Points Possible – Higher Is Better

RAW MATERIAL	Base Material Scores				Material Environmental Attributes				Supplier Practices						Total Score
	Chemistry	Energy and Greenhouse Gas Intensity	Water & Land Use Intensity	Physical Waste	Material Greening Effort[1]	Water Conservation Dye[2]	Recycled Content	Organic Content	RSL Program	Self-Evaluation: Chem & Facility[1]	Nike Water Program	Water Conservation Recycling[2]	Nike Energy & Carbon Program	Sustainability Cert. & Program	
Max Points	**50.0**				**24**	0	7	12	**26**	0	5	5	5	4	7	
Polyester – 100% Virgin	**24.3**				**0**				**10**						**34**
Polyester – 100% Recycled	**24.3**				**12**				**0**						**36**
Cotton, 50% Organic/ 50% Conventional	**22.6**				**2.5**				**10**						**35**
Rubber, Styrene Butadiene 100%	**26.5**				**4**				**–10**	**–3**	**–2**	**–5**			**21**

[1] Must achieve a "0" score for Material Greening Effort before points can be gained through Self-Evaluation: Chemicals & Facility.
[2] Points for "Water Conservation" are awarded at the Material or the Supplier level, but not both.

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Reports & Assessments

Comparison to ISO 14044 Data Requirements

We conducted a self-assessment of the general alignment between the data we used in the preparation of Nike MSI as compared to the ISO 14044 Standard for Environmental Management – Life Cycle Assessment – Requirements and Guidelines. Nike MSI was never intended to be an endpoint-driven life cycle assessment for materials compliant with ISO 14044. Instead, it is a means of providing a comparative scoring system for materials based on the relative score from the four impact areas. It employs the ISO methodology where applicable.

NikeMSI_Alignment_ISO14044.pdf

Comparison with LCIA Framework

Nike contracted with Greg Norris to express the Nike MSI algorithm in modular form, as closely as possible to life cycle impact assessment (LCIA) methods and explicitly noting any differences. Norris is Adjunct Professor with the University of Arkansas, where he contributes to the work of The Sustainability Consortium. He also teaches life cycle assessment (LCA) at Harvard and is Adjunct Lecturer at the Harvard School of Public Health. Norris founded Sylvatica, an international LCA institute, which consults with the United Nations, governments in the United States and abroad, a variety of Fortune 500 and smaller companies, industrial associations and the non-profit sector. He also founded Earthster, an open-source sustainable information platform, and New Earth, a global fund for community-driven sustainable development.

GregNorris_CV.pdf

» Report: Comparison of Nike Materials Sustainability Index to the LCIA Framework

Sustainability Principles Evaluation

The Natural Step (TNS) is an international non-profit organization founded with the vision of a sustainable society. Their mission is to accelerate change toward sustainability, by developing and equipping decision makers across the globe with a unifying Framework for Strategic Sustainable Development. For two decades, TNS has been helping decision makers identify the gap to full social and ecological sustainability, envision solutions to their challenges and develop strategic paths to a more sustainable future.

Nike has partnered with TNS for more than 14 years on sustainability awareness, vision, and North Star goal development. Nike contracted with TNS to review Nike MSI and assess its alignment with sustainability principles and the overall TNS Framework.

NikeMSI_TNSReview.pdf

» www.naturalstep.org

Duke Center for Sustainability and Commerce

The Sustainable Apparel Coalition commissioned the Duke Center for Sustainability and Commerce to lead a technical review of Nike MSI. This effort was undertaken between October 2011 and June 2012 by an international group of academic researchers comprised of specialists in life cycle analysis, green design and sustainable supply chains. The review team participated in webinars with Nike and their environmental consultants, one-on-one discussions and an in-person team meeting in Durham, North Carolina, USA, in January of 2012. The objective was to provide the Sustainable Apparel Coalition with a technical and operational review of Nike MSI and identify specific opportunities to enhance its scientific foundations to gain wider acceptance from the scientific and practitioner communities.

The review is not intended to be ISO compliant. Rather it is an examination of the scientific robustness of Nike MSI for its "intended purpose" within the Sustainable Apparel Coalition as a tool to assist and inform designers.

Environmental Consultants

Framework and Methodology

To develop Nike MSI, Nike contracted with Brown and Wilmanns Environmental, LLC (BWE) to provide technical expertise for assessing materials impacts. In this capacity, BWE acted as the primary researchers, developed assessment framework options, analyzed data, identified and filled data gaps, developed algorithms, and created and populated the spreadsheets that drive the tool.

BrownWilmanns_CV.pdf

BrownWilmanns_Background.pdf

» www.bw-environmental.com

Chemistry Toxicology Evaluation

AMEC evaluated chemical substances identified for each material assessed in the Nike MSI by searching up to 21 published literature and database sources to summarize and record various numerical and qualitative toxicity measurements. AMEC's substance evaluation results are the basis of the Nike MSI Chemistry hazard impacts scored in the Nike MSI.

AMEC_Geomatrix_CV.pdf

» www.amec.com

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Acronyms

BOD	biochemical oxygen demand
BOM	bill of materials
BR	polybutadiene
BWE	Brown & Wilmanns Environmental, LLC
C0D	chemical oxygen demand
$C0_2e$	carbon dioxide equivalent
ECAT	Energy and Carbon Assessment Tool
EVA	ethylene vinyl acetate
GHG	greenhouse gas
GMO	genetically modified organism
ha	hectare
kg	kilogram
KPI	key performance indicator
l	liter
LCA	life cycle assessment
LCI	life cycle inventory
LCIA	life cycle impact analysis
mg	milligram
MJ	megajoule
Nike MSI	Nike Materials Sustainability Index
PLA	polylactic acid
PVA	polyvinyl alcohol
RSL	restricted substance list
SAC	Sustainable Apparel Coalition
SBR	styrene butadiene
TNS	The Natural Step

Glossary of Terms

Base Material Score. A numeric score derived from an evaluation of four environmental impact areas using a representative supply chain.

Cradle-to-gate. The cradle-to-gate life cycle spans the origin of raw materials to a finished textile or component part, ready to be shipped to a product manufacturing facility.

Federated wiki. As developed by Ward Cunningham, who created the original wiki software, a federated wiki enables a unified view of data and content from diverse owners.

Material Environmental Attributes. A category of Nike MSI points that reward a finished material for incorporating Green Chemistry, Recycled and Organic content, and Water Conservation.

Step function. A function that 'buckets' data to produce scores within upper and lower limits.

Supplier Practices. A category of Nike MSI points that reward best practices in a specific supply chain scenario, including testing performance in Nike's RSL Program, Water Program, Energy and Carbon Program, as well as participation in voluntary Sustainability Certifications & Programs.

Update History

Version 1 Pre-release, September 2011

Version 1.1, February 2012

- Updates to Table 15
- New attached files

Version 2 SAC Release, July 2012

- Incorporates responses to critical findings from the Technical Review Committee and simplifies content.

About NIKE, Inc.

NIKE, Inc., based near Beaverton, Oregon, is the world's leading designer, marketer and distributor of authentic athletic footwear, apparel, equipment and accessories for a wide variety of sports and fitness activities. Wholly owned Nike subsidiaries include Converse Inc., which designs, markets and distributes athletic footwear, apparel and accessories; and Hurley International LL C, which designs, markets and distributes action sports and youth lifestyle footwear, apparel and accessories. For more information, visit www.nikeinc.com.