DRAFT PRODUCT ENVIRONMENTAL FOOTPRINT CATEGORY RULES (PEFCR)

APPAREL AND FOOTWEAR

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How to read this document

This document includes different types of information:

- **Notes addressed to the reader** are presented in orange boxes, as shown below:

Note	This document is based on the template provided by in Annex B: PEF Report Template of the PEF method (2019) which shall be applied for all types of PEFCR.

- **Sections of the template** for the PEFCR per the PEF method are copied directly and:
  - Indicated in grey and with square brackets ([ ]) for instructions;
  - Indicated in *italics* for PEFCR content.

  Instructions will be replaced at a later date (or kept in some cases with the grey and brackets removed) as the PEFCR is completed.

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236 Acronyms and abbreviations

µm	Micrometre
AWARE	Available WAter REmaining
BOM	Bill Of Materials
BSI	British Standards Institution
CEC	European Footwear Confederation
CFCs	Chlorofluorocarbons
CELC	European Confederation of Flax and Hemp
CFs	Characterization Factors
CFF	Circular Footprint Formula
CNMI	Camera Nazionale della Moda Italiana
CMWG	Cattle Model Working Group
CO_2	Carbon Dioxide
CPA	Classification of Products by Activity
CTUe	Comparative Toxic Units for ecosystems
CTUh	Comparative Toxic Units for human health
D2C	Direct to Consumer
DC	Distribution Centre
DNM	Data Needs Matrix
DQR	Data Quality Rating
EC/DG-ENV	European Commission/Directorate-General for the Environment
ECOS	Environmental Coalition on Standards
EEB	European Environmental Bureau
EF	Environmental Footprint
EFTA	European Free Trade Association
EVA	Ethylene Vinyl Acetate
ELCD	European reference Life Cycle Database
EOL	End Of Life
FAO	Food and Agriculture Organization of the United Nations
FESI	Federation of the European Sporting Goods Industry
FHCM	Fédération de la Haute Couture et de la Mode
FU	Functional Unit
g	gram
GHGs	Greenhouse Gases
GeR	Geographical Representativeness
GeR_{SD}	Geographical Representativeness evaluated at the level of the secondary dataset
Higg PM	Higg Product Module
IFF	International Fur Federation
ILCD	International reference Life Cycle Data system
IPCC	Intergovernmental Panel on Climate Change
ISO	International Organization for Standardization
IWTO	International Wool Textile Organisation
JRC	Joint Research Centre
kBq U^{235} eq	kilobecquerel uranium-235 equivalent
kcal	kilocalorie
kg	kilogram
kg CFC-11 eq	kilogram of trichlorofluoromethane or freon-11 equivalent
kg CO_2-eq	kilogram of carbon dioxide equivalent

kg N eq	kilogram of nitrogen equivalent
kg NMVOC eq	kilogram of non-methane volatile organic compounds equivalent
kg P eq	kilogram of phosphorus equivalent
kg Sb eq	kilogram of antimony equivalent
km	kilometre
kWh	kilowatt-hour
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
LCIA	Life Cycle Inventory Assessment
LCS	Life Cycle Stage
LHVs	Lower Heating Values
LUC	Land Use Change
m^3	cubic metre
ME	Metabolizable Energy
MJ	*Megajoule*
mol H^+	mole of Hydrogen ion
mol N eq	mole of Nitrogen equivalent
NACE	Nomenclature Générale des Activités Economiques dans les Communautés Européennes
NOx	Nitrogen Oxides
ODP	Ozone Depletion Potential
P	Precision/uncertainty
P_{AD}	Precision evaluated at the level of the Activity Data
PE	Polyethylene
PEF	Product Environmental Footprint
PEFCR	Product Environmental Footprint Category Rules
PET	Polyethylene Terephthalate
PM	Particulate Matter
Pt	Point for dimensionless values
PTFE	Polytetrafluoroethylene
RP	Representative Product
SAC	Sustainable Apparel Coalition
SMGP	Single Market for Green Products
t	tonne
TAB	Technical Advisory Board
TeR	Technological Representativeness
TeR_{SD}	Technological Representativeness evaluated at the level of the secondary dataset
TiR	Time Representativeness
TiR_{AD}	Time Representativeness evaluated at the level of the activity data
TiR_{SD}	Time Representativeness evaluated at the level of the secondary dataset
tkm	tonne kilometre
TS	Technical Secretariat
UUID	Universally Unique Identifier
VOCs	Volatile Organic Compounds

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Definitions

[List in this section all the definitions that are relevant for the PEFCR. Those already included in the latest version of the PEF method or the Annex A shall be copied in their original form. The definitions shall be provided in alphabetical order.]

This glossary defines key terms used in this document.

Life Cycle Assessment definitions

Definitions with an asterix (*) come from "Suggestions for updating the Product Environmental Footprint (PEF) method" (Zampori et al., 2019) and is herein referred to as the PEF method. For further clarifications, please refer to the PEF method.

Activity data*	This term refers to information which is associated with processes while modelling Life Cycle Inventories (LCI). The aggregated LCI results of the process chains that represent the activities of a process are each multiplied by the corresponding activity data and then combined to derive the environmental footprint associated with that process. Examples of activity data include quantity of kilowatt-hours of electricity used, quantity of fuel used, output of a process (e.g. waste), number of hours equipment is operated, distance travelled, floor area of a building, etc. Synonym of "non-elementary flow.
Acidification*	EF impact category that addresses impacts due to acidifying substances in the environment. Emissions of NO_x, NH_3 and SO_x lead to releases of hydrogen ions (H+) when the gases are mineralised. The protons contribute to the acidification of soils and water when they are released in areas where the buffering capacity is low, resulting in forest decline and lake acidification.
Aggregated dataset*	Complete or partial life cycle of a product system that next to the elementary flows (and possibly not relevant amounts of waste flows and radioactive wastes) lists in the input/output list exclusively the product(s) of the process as reference flow(s), but no other goods or services. Aggregated datasets are also called "LCI results" datasets. The aggregated dataset may have been aggregated horizontally and/or vertically.
Allocation*	An approach to solving multi-functionality problems. It refers to "partitioning the input or output flows of a process or a product system between the product system under study and one or more other product systems" (ISO 14040:2006).
Application specific*	It refers to the generic aspect of the specific application in which a material is used. For example, the average recycling rate of PET in bottles.
Background processes*	Refers to those processes in the product life cycle for which no direct access to information is possible. For example, most of the upstream life-cycle processes and generally all processes further downstream will be considered part of the background processes.
Benchmark*	A standard or point of reference against which any comparison may be made. In the context of PEF, the term 'benchmark' refers to the average environmental performance of the representative product sold in the EU market.
Characterisation*	Calculation of the magnitude of the contribution of each classified input/output to their respective EF impact categories, and aggregation of contributions within each category. This requires a linear multiplication of the inventory data with characterisation factors for each substance and EF impact category of concern. For

	example, with respect to the EF impact category "climate change", CO_2 is chosen as the reference substance and kg CO_2-equivalents as the reference unit.
Climate change*	All inputs or outputs that result in greenhouse gas emissions. The consequences include increased average global temperatures and sudden regional climatic changes. Climate change is an impact affecting the environment on a global scale.
Company-specific data*	It refers to directly measured or collected data from one or multiple facilities (site-specific data) that are representative for the activities of the company. It is synonymous to "primary data". To determine the level of representativeness, a sampling procedure may be applied.
Comparative assertion*	An environmental claim regarding the superiority or equivalence of one product versus a competing product that performs the same function (including the benchmark of the product category) (adapted from ISO 14044:2006).
Comparison*	A comparison, not including a comparative assertion, (graphic or otherwise) of two or more products based on the results of a PEF study and supporting PEFCR.
Cradle to grave	A product's life cycle that includes raw material extraction, processing, distribution, storage, use, and disposal or recycling stages. All relevant inputs and outputs are considered for all of the stages of the life cycle.
Critical review*	Process intended to ensure consistency between a PEFCR and the principles and requirements of the PEF method.
Data Quality Rating*	Semi-quantitative assessment of the quality criteria of a dataset based on Technological representativeness, Geographical representativeness, Time-related representativeness, and Precision. The data quality shall be considered as the quality of the dataset as documented.
Disaggregation*	The process that breaks down an aggregated dataset into smaller unit process datasets (horizontal or vertical). The disaggregation may help making data more specific. The process of disaggregation should never compromise or threat to compromise the quality and consistency of the original aggregated dataset.
Downstream*	Occurring along a product supply chain after the point of referral.
Ecotoxicity, freshwater*	Environmental footprint impact category that addresses the toxic impacts on an ecosystem, which damage individual species and change the structure and function of the ecosystem. Ecotoxicity is a result of a variety of different toxicological mechanisms caused by the release of substances with a direct effect on the health of the ecosystem.
Electricity tracking*	Electricity tracking is the process of assigning electricity generation attributes to electricity consumption.
Elementary flows*	In the life cycle inventory, elementary flows include "material or energy entering the system being studied that has been drawn from the environment without previous human transformation, or material or energy leaving the system being studied that is released into the environment without subsequent human transformation" (ISO 14040, 3.12). Elementary flows include, for example, resources taken from nature or emissions into air, water, soil that are directly linked to the characterisation factors of the EF impact categories.
Eutrophication*	Nutrients (mainly nitrogen and phosphorus) from sewage outfalls and fertilised farmland accelerating the growth of algae and other vegetation in water. The degradation of organic material consumes oxygen, resulting in oxygen deficiency and, in some cases, fish death. Eutrophication translates the quantity of substances emitted into a common measure expressed as the oxygen required for the degradation of dead biomass. Three EF impact categories are used to assess the impacts due to eutrophication: Eutrophication, terrestrial; Eutrophication, freshwater; Eutrophication, marine.

Foreground processes*	Refer to those processes in the product life cycle for which direct access to information is available. For example, the producer's site and other processes operated by the producer or its contractors (e.g. goods transport, head-office services, etc.) belong to the foreground processes.
Functional unit*	The functional unit defines the qualitative and quantitative aspects of the function(s) and/or service(s) provided by the product being evaluated. The functional unit definition answers the questions "what?", "how much?", "how well?", and "for how long?".
Global warming potential*	Capacity of a greenhouse gas to influence radiative forcing, expressed in terms of a reference substance (for example, CO_2-equivalent units) and specified time horizon **(**e.g. GWP 20, GWP 100, GWP 500, for 20, 100, and 500 years respectively)**.** It relates to the capacity to influence changes in the global average surface-air temperature and subsequent change in various climate parameters and their effects, such as storm frequency and intensity, rainfall intensity and frequency of flooding, etc.
Human toxicity – cancer*	EF impact category that accounts for adverse health effects on human beings caused by the intake of toxic substances through inhalation of air, food/water ingestion, penetration through the skin insofar as they are related to cancer.
Human toxicity – non cancer*	EF impact category that accounts for the adverse health effects on human beings caused by the intake of toxic substances through inhalation of air, food/water ingestion, penetration through the skin insofar as they are related to non-cancer effects that are not caused by particulate matter/respiratory inorganics or ionising radiation.
Input flows*	Product, material or energy flow that enters a unit process. Products and materials include raw materials, intermediate products and co-products (ISO 14040:2006).
Ionising radiations, human health*	EF impact category that accounts for the adverse health effects on human health caused by radioactive releases.
Land use*	EF impact category related to use (occupation) and conversion (transformation) of land area by activities such as agriculture, forestry, roads, housing, mining, etc. Land occupation considers the effects of the land use, the amount of area involved and the duration of its occupation (changes in quality multiplied by area and duration). Land transformation considers the extent of changes in land properties and the area affected (changes in quality multiplied by the area).
Life cycle*	Consecutive and interlinked stages of a product system, from raw material acquisition or generation from natural resources to final disposal (ISO 14040:2006).
Life cycle approach*	Takes into consideration the spectrum of resource flows and environmental interventions associated with a product from a supply-chain perspective, including all stages from raw material acquisition through processing, distribution, use, and end of life processes, and all relevant related environmental impacts (instead of focusing on a single issue).
Life cycle assessment*	Compilation and evaluation of the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle (ISO 14040:2006).
Life cycle inventory dataset*	A document or file with life cycle information of a specified product or other reference (e.g., site, process), covering descriptive metadata and quantitative life cycle inventory. A LCI dataset could be a unit process dataset, partially aggregated or an aggregated dataset.
Normalisation*	After the characterisation step, normalisation is the step in which the life cycle impact assessment results are multiplied by normalisation factors that represent the overall inventory of a reference unit (e.g. a whole country or an average citizen). Normalised life cycle impact assessment results express the relative shares of the impacts of the analysed system in terms of the total contributions to each impact category per reference unit. When displaying the normalised life cycle impact assessment results

	of the different impact topics next to each other, it becomes evident which impact categories are affected most and least by the analysed system. Normalised life cycle impact assessment results reflect only the contribution of the analysed system to the total impact potential, not the severity/relevance of the respective total impact. Normalised results are dimensionless, but not additive.
Output flows*	Product, material or energy flow that leaves a unit process. Products and materials include raw materials, intermediate products, co-products and releases (ISO 14040:2006).
Ozone depletion*	EF impact category that accounts for the degradation of stratospheric ozone due to emissions of ozone-depleting substances, for example long-lived chlorine and bromine containing gases (e.g. CFCs, HCFCs, Halons).
Partially disaggregated dataset*	A dataset with a LCI that contains elementary flows and activity data, and that only in combination with its complementing underlying datasets yield a complete aggregated LCI data set.
Particulate matter*	EF impact category that accounts for the adverse health effects on human health caused by emissions of Particulate Matter (PM) and its precursors (NO_x, SO_x, NH_3).
PEF profile*	The quantified results of a PEF study. It includes the quantification of the impacts for the various impact categories and the additional environmental information considered necessary to report.
PEF study*	Term used to identify the totality of actions needed to calculate the PEF results. It includes the modelling, the data collection, and the analysis of the results. It excludes the PEF report and the verification of the PEF study and report.
Photochemical ozone formation*	EF impact category that accounts for the formation of ozone at the ground level of the troposphere caused by photochemical oxidation of volatile organic compounds (VOCs) and carbon monoxide (CO) in the presence of nitrogen oxides (NO_x) and sunlight. High concentrations of ground-level tropospheric ozone damage vegetation, human respiratory tracts and manmade materials through reaction with organic materials.
Primary data or site-specific data*	This term refers to data from specific processes within the supply chain of the user of the PEF method or user of the PEFCR. Such data may take the form of activity data, or foreground elementary flows (life cycle inventory). Primary data are site-specific, company-specific (if multiple sites for the same product) or supply chain specific. Primary data may be obtained through meter readings, purchase records, utility bills, engineering models, direct monitoring, material/product balances, stoichiometry, or other methods for obtaining data from specific processes in the value chain of the user of the PEF method or user of the PEFCR. In this method, primary data is synonym of "company-specific data" or "supply-chain specific data".
Reference flow*	Measure of the outputs from processes in a given product system required to fulfil the function expressed by the functional unit (based on ISO 14040:2006).
Representative product (model)*	The RP may be a real or a virtual (non-existing) product. The virtual product should be calculated based on average European market sales-weighted characteristics of all existing technologies/materials covered by the product category or sub-category. Other weighting sets may be used, if justified, for example weighted average based on mass (ton of material) or weighted average based on product units (pieces).
Resource use, fossil*	EF impact category that addresses the use of non-renewable fossil natural resources (e.g. natural gas, coal, oil).
Resource use, minerals and metals*	EF impact category that addresses the use of non-renewable abiotic natural resources (minerals and metals).

Secondary data*	It refers to data not from a specific process within the supply-chain of the company performing a PEF study. This refers to data that is not directly collected, measured, or estimated by the company, but sourced from a third party LCI database or other sources. Secondary data includes industry average data (e.g., from published production data, government statistics, and industry associations), literature studies, engineering studies and patents, and may also be based on financial data, and contain proxy data, and other generic data. Primary data that go through a horizontal aggregation step are considered as secondary data.
Sensitivity analysis*	Systematic procedures for estimating the effects of the choices made regarding methods and data on the results of a PEF study (based on ISO 14040: 2006).
Sub-processes*	Those processes used to represent the activities of the level 1 processes (= building blocks). Sub-processes may be presented in their (partially) aggregated form.
System boundary*	Definition of aspects included or excluded from the study. For example, for a "cradle-to-grave" EF analysis, the system boundary includes all activities from the extraction of raw materials through the processing, distribution, storage, use, and disposal or recycling stages.
Unit process *	Smallest element considered in the LCI for which input and output data are quantified (based on ISO 14040:2006).
Upstream*	Occurring along the supply chain of purchased goods/ services prior to entering the system boundary.
Water use*	It represents the relative available water remaining per area in a watershed, after the demand of humans and aquatic ecosystems has been met. It assesses the potential of water deprivation, to either humans or ecosystems, building on the assumption that the less water remaining available per area, the more likely another user will be deprived (see also http://www.wulca-waterlca.org/aware.html).
Weighting*	Weighting is a step that supports the interpretation and communication of the results of the analysis. PEF results are multiplied by a set of weighting factors, which reflect the perceived relative importance of the impact categories considered. Weighted EF results may be directly compared across impact categories, and also summed across impact categories to obtain a single overall score.

Apparel and footwear definitions

Definitions come from:

- * "Clothing Technology, from fibre to fashion" (Eberle, 2004)
- ¤ "How Shoes are Made" (Motawi, 2018)

Colour fastness*	Fastness of dyes and prints to rubbing, washing, cross staining, light, weather, seawater, ironing and dry-cleaning solvents.
Deadstock	Deadstock is defined as products that could not be sold in traditional sales channels, or through discount sales or private sales (translation of décret n° 2020-1724 du 28 décembre 2020 relatif à l'interdiction d'élimination des invendus non alimentaires et à diverses dispositions de lutte contre le gaspillage).
Die cutting ¤	Most shoe parts are made by die cutting. The cutting die looks just like a big cookie cutter but has a sharpened steel edge. Each shoe part will require its own cutting die.

Dimensional stability*	Dimensional changes (shrinking or stretching) during aftercare laundering and cleaning procedures.
Dyeing and finishing*	Includes all fabric processes that are not included in fibre production, yarn production, and fabric formation. Finishing effectively means to improve or to beautify the material, ready for sale. There are generally three basic objectives in finishing • Modification of the surface (raising, smoothing, embossing etc) • Modification of the wearing properties (staining, creasing, draping etc) • Modification of aftercare characteristics (ironing, shrinking etc)
Stalks fibre extraction (originally for flax)*	After pulling and roughing out the plant. • **Retting** degrades the woody part of the stems so that the fibres are loosened. The stalks are placed in tanks of warm water where they lay for 5 to 8 days. This is followed by drying. • Breaking and **Scutching**: after loosening the fibres from the wood by retting, the straw is broken and the woody parts are removed by scutching. The products are line fibre, with a length of 45 to 90 cm, and scutcher tow, with a length of 10 to 25 cm.
Grading*	Grading means the stepwise increase or decrease of a master pattern piece to create larger or smaller sizes. The starting point can be the smallest size or the middle size. Grading alters the overall size of a design but not its general shape and appearance. Computer-aided grading systems utilise internal calculation algorithms (grading rules) for pattern construction.
Higg Product Module (PM)	The Product Module is a sustainability assessment tool that considers a product's environmental impact from creating materials all the way to product end-of-life, developed by the SAC (Sustainable Apparel Coalition website).
Knitting*	Knitted fabrics are made from interlocking loops, formed from a single yarn or from many (ISO 7839:1984). Circular knitting - The fabric is manufactured on circular machines as long lengths in the form or a tube. The fabric can be maintained in its tubular form throughout processing or, after the preparation and dyeing operations, it can be cut open for final finishing and garment making.
Pattern*	A pattern is a diagrammatic representation of the way a garment part is constructed. This forms the working plan for its manufacture.
Piling resistance*	Measurement of the number of pills that form during a defined period of surface rubbing.
Repairability	The capacity of a product to be repaired. This should not be confused with the "likelihood that the product will be repaired".
Retting*	See bast fibre extraction.
Scouring*	Removal of natural or adventitious impurities, or processing aids (waxes, lubricants) applied during yarn and fabric formation.
Scutching	See stalks fibre extraction.
Stockfitting ¤	Stockfitting is an assembly operation that is done away from the main assembly. The separate outsole components are assembled on the stock fitting line before they are taken to the main assembly line.
Treatments (finishing)* *Reworded for clarity*	Whereas mechanical (dry) finishing is concerned mainly with modifying the surface of the fabric, chemical finishing (wet) aims to effect a radical change in the basic fibre or fabric properties, in order to improve some aspect of its behaviour. • Examples of dry finishes are framing, raising, embossing, sanding.

- Examples of wet finishes are water repellence, stain resistance, flame resistance, anti-pilling.

Weaving* Weaving is the name given to the interleaving of two sets of yarns, warp and weft, at right angles.

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1. Introduction

The Product Environmental Footprint (PEF) method provides detailed and comprehensive technical rules on how to conduct PEF studies that are more reproducible, consistent, robust, verifiable and comparable. Results of PEF studies are the basis for the provision of EF information and they may be used in a diverse number of potential fields of applications, including in-house management and participation in voluntary or mandatory programmes.

For all requirements not specified in this PEFCR the user of the PEFCR shall refer to the documents this PEFCR is in conformance with (see Section 2.7).

The compliance with the present PEFCR is optional for PEF in-house applications, whilst it is mandatory whenever the results of a PEF study or any of its content is intended to be communicated.

Terminology: shall, should and may

This PEFCR uses precise terminology to indicate the requirements, the recommendations and options that could be chosen when a PEF study is conducted.

- *The term "shall" is used to indicate what is required in order for a PEF study to be in conformance with this PEFCR.*
- *The term "should" is used to indicate a recommendation rather than a requirement. Any deviation from a "should" requirement has to be justified when developing the PEF study and made transparent.*
- *The term "may" is used to indicate an option that is permissible. Whenever options are available, the PEF study shall include adequate argumentation to justify the chosen option.*

2. General information about the PEFCR

2.1. Technical Secretariat

[The list of the organizations in the Technical Secretariat (TS) at the time of approval of the final PEFCR shall be provided. For each one, the type of organization shall be reported (industry, academia, NGO, consultant, etc.), as well as the starting date of participation. The TS may decide to include also the names of the members of the persons involved for each organization]

The Technical Secretariat is responsible for the development of this PEFCR. It is made up of voting and non-voting members, as well as observers.

- Technical Secretariat members will aspire to define common positions through consensus. The TS defines consensus as the absence of sustained opposition.
- The meeting chair will actively pursue consensus among members.
- In case consensus cannot be reached, a vote will be organised. The overall position will be adopted by two-thirds majority.

To ensure TS members' equal representation in all votes referred to in the terms of reference, the voting rights are as follow:

- For voting members: each financially contributing organisation has one vote;
- For members joining the TS later on: each financially contributing has one vote

Table 1 PEF Apparel and Footwear TS members

No.	Name of the organization	Type of organisation	**Starting date of participation**	Main contact(s)	Member status
1	SAC	Industry association	January 2020	Baptiste Carriere-Pradal Joël Mertens	Secretariat lead Voting
2	ADEME	Government agency	January 2020	Erwan Autret	Voting
3	C&A	Industry	January 2020	Galina Parmenter	Voting
4	CELC	Industry association	January 2021	Marie Demagdt	Voting
5	Cotton Incorporated	Industry association	January 2020	Michele Wallace	Voting
6	Décathlon	Industry	January 2020	Raffaele Duby Quentin Badonnel	Voting
7	ECOS	NGO	December 2021	Valeria Botta	Non-voting

No.	Name of the organization	Type of organisation	**Starting date of participation**	Main contact(s)	Member status
8	FHCM	Industry association	March 2021	Léonore Garnier	Voting
9	H&M	Industry	January 2020	Anna Eklof Asp	Voting
10	Inditex	Industry	January 2020	Natalia Capelan Teijido Germán García Ibáñez	Voting
11	IWTO	Industry association	January 2020	Jeanette Cook	Voting
12	Lacoste	Industry	September 2020	Steve Duhamel Frédéric LeCoq Raynald Anquet	Voting
13	Nike Inc	Industry	January 2020	Adam Brundage Marjorie Gass	Voting
14	Refashion (Eco-TLC)	Industry association	January 2020	Hélène Daret Adèle Routhiau Maud Hardy	Voting
15	Sympatex	Industry	January 2020	Rüdiger Fox	Voting
16	VF Corporation	Industry	January 2020	Jordan Chamberlain	Voting
17	W.L. Gore & Associates	Industry	January 2020	Benjamin Bowers Marie Mawe	Voting
18	CEC	Industry association	January 2020	Carmen Arias	Non-voting
19	CNMI	Industry association	January 2020	Chiara Luisi	Non-voting
20	COTANCE	Industry association	January 2020	Gustavo Gonzalez-Quijano	Non-voting
21	EURATEX	Industry association	January 2020	Mauro Scalia	Non-voting
22	FESI	Industry association	January 2020	Luca Boniolo	Non-voting
23	IFF (Fur Europe)	Industry association	January 2020	Adam Gono	Non-voting
24	European Commission EF Team	Government	January 2020	Alicia Boyano Larriba	Observer
25	European Environmental Bureau (EEB)	NGO	January 2020	Jean-Pierre Schweitzer	Observer
26	Quantis	Consultant	January 2020	Angela Adams Emilie Carasso	Technical expert

2.2. Consultations and stakeholders

[For each public consultation the following information shall be provided:

- Opening and closing date of the public consultation
- Number of comments received
- Names of organizations that have provided comments

- Link to the online platform]

First public consultation

The first public consultation took place from 7 July 2021 to 24 September 2021, on the PEFCR for apparel and footwear stakeholder workspace.

A total of 996 comments were received from the following organisations:

Table 2 - Participants to the first public consultation

Company	Name
A W Hainsworth & Sons Ltd.	Diane Simpson
AASMB	Sally Hicks
ADEME	Autret
Australian Superfine Woolgrowers Association	Catherine Hayne
Bahariye Mensucat A.S.	SANSAL CETIN
Benetton Group	Roberto Taiariol
BKB Ltd	Lindsay Humphreys
Blaikie Science Solutions	Frances Blaikie
Botto Giuseppe e Figli Spa	Silvio Botto Poala
British Wool	Haldi Kranich-Wood
Campaign for Wool	Marshall Allender
Cape Wools SA	Deon Saayman
Cashmere and Camel Hair Manufacturers Institute	Fabio Garzena
Chambre Syndicale des Laines de France	Anne-Laure Milhe
Clear Fashion	n/a
CLEON	CLEON J
Collectif Tricolor, France	Pascal Gautrand
Consumption Research Norway, Oslo Metropolitan University	I.G. Klepp and K. Laitala
COTANCE	Gustavo G-Quijano
Cotton Council International	n/a
CTCP-APICCAPS	n/a
Ecoinnovazione	Alessandra
ECOS	Valeria Botta
EEB	n/a
Ellen MacArthur Foundation	Carsten Wachholz

Company	Name
En Mode Climat : a movement of 200 French brands demanding more regulation to fight climate change	Guillaume Declair
ERAM	Gauthier Bedek
Ermenegildo Zegna Group	Fulvio Benetti
EurEau	Rafael Heredero
FAIRLY MADE	Clément AUMAND
FAIRLY MADE	Leïla GIMENO
FAIRLY MADE	Pierre DIENOT
Fédération de la maille, de la lingerie et du balnéaire (FMLB) - France	Mathilde LESPETS
Fédération Nationale Ovine	Audrey Desormeaux
Federation of Norwegian Industry Textile & Clothing Sector. + Norwegian Fashion & Textile Agenda	Kjersti Kviseth
FFC	Guilloux Bonnet
FFILC / CLUB LAINE	Joëlle DA FONSECA RUELLAN
Fibershed	Heather Podoll
FICE	Miriam
Fratelli Piacenza S.P.A.	Ettore Piacenza
French Ministry for Environment Ministère de la transition écologique (CGDD)	Pascal Degras
Friends fo the Earth Norway	Janne Gilgren
G Modiano Ltd.	Michael Modiano
G.Schneider	Giovanni Schneider
GEMO	Isabelle R.
Global Organics Textile Standards	Christopher Stopes
Hess Natur	Oppenländer
HUGO BOSS	Heinz Zeller
Humeau-Beaupreau	AC HUMEAU
INESCOP	n/a
International Sericultural Commission, Bengalore, India (www.inserco.org)	Dileep Kumar R, Programme Coordinator
IVGT	Schmidt
Lanecardate spa	Chiara Bianchi Maiocchi
Leather UK	Kerry Senior
Marzotto Wool Manufacturing	Vincenzo Tumino
MOHAIR SOUTH AFRICA	Jackie Gant
National Council of Wool Selling Brokers of Australia (NCWSBA)	Paul Deane, Executive Director

Company	Name
NEF coordinator	Charlotte Thy
Nejdecka cesarna vlny a.s.	Ladislav Mikes
New South Wales Farmers Association Wool Committee	Hellen Carrigan
Norwegian Network for Sustainable Textiles	Janne Gilgren (Friends of the earth Norway), Siv Elin Ånestad (Future in our hands Norway), Tone Skårdal Tobiasson (Nice Fashion)
Pantex spa	Piercarlo Zedda
Ratti spa	Massimo Lolli
Segard Masurel	Olivier Segard
Servizi e Seta	Giovanni Schneider
Sphera - EF Helpdesk	Daniel Thylmann, Lana Reid-McConnell, John Jewell
Successori Reda S.p.A.	Luca Bruschi
Suedwolle Group Italia SPA	Davide Marcante
Suedwollegroup	Lindner
Swedish EPA/Swedish Life Cycle Center	Björn Spak
t+m	Eckert
The Woolmark Company	Ella Edwards
UICSO	JEGOU
UIT	Eric BOEL
Union des Industries Textiles Sud (UIT Sud)	Richard RICO
Vitale Barberis Canonico	Lucia Bianchi Maiocchi
WAFarmers	Jessica Wallace
Worldproducers Australia	Jo Hall
Yukan (Glimpact)	Frédéric Bettens, Klara Cielen & Edgar Towa
Zegna Baruffa Lane Borgosesia S.p.A.	Alfredo Botto Poala

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Note	Second consultation information to be completed at a later date.

312 2.3. Review panel and review requirements of the PEFCR

313 The names and the affiliations of the members of the review panel are listed in Table 3 below.

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Table 3 PEFCR review panel

Name of the member	Affiliation	Role
Ugo Pretato	Studio Fieschi & soci	Chair – LCA expert
Laurent Maeder	Maeder Conseils	Industry expert
Sonia Valdivia	World Resources Forum	NGO representative

The reviewers have verified that the following requirements are fulfilled:

- *The PEFCR has been developed in accordance with the requirements provided in the PEF method and Annex A of the PEF method;*
- *The PEFCR supports the creation of credible, relevant and consistent PEF profiles;*
- *The PEFCR scope and the representative products are adequately defined;*
- *The functional unit, allocation and calculation rules are adequate for the product category under consideration;*
- *Datasets used in the PEF-RPs and the supporting studies are relevant, representative, reliable, and in compliance with data quality requirements;*
- *The selected additional environmental and technical information are appropriate for the product category under consideration and the selection is done in accordance with the requirements stated in the PEF method,*
- *The model of the RP and corresponding benchmark (if applicable) represent correctly the product category or sub-category;*
- *The RP model, disaggregated in line with the PEFCR and aggregated in ILCD format, are EF compliant following the rules available at: http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml ;*
- *The RP model in its corresponding Excel version is compliant with the rules outlined in Section A.2.3 of Annex A;*
- *The Data Needs Matrix is correctly implemented;*
- *The classes of performance, if identified, are appropriate for the product category.*

[The TS may add additional review criteria as appropriate]

The public review reports are provided in Annex X of this PEFCR.

[The review panel shall produce: i) a public review report for each PEF-RP, ii) a public review report for the final PEFCR].

Note	Review reports to be completed in the final stage of the PEFCR development process, expected in Q3 2023.

2.4. Review statement

Note	Review statement to be completed in the final stage of the PEFCR development process, expected in Q3 2023.

This PEFCR was developed in compliance with the PEF Method adopted by the Commission on [indicate the date of approval of the latest version available].

The representative product(s) correctly describe the average product(s) sold in Europe for the product category/sub-category in scope of this PEFCR.

PEF studies carried out in compliance with this PEFCR would reasonably lead to reproducible results and the information included therein may be used to make comparisons and comparative assertions under the prescribed conditions (see chapter on limitations). [the last part of this statement shall be deleted in case the PEFCR is for intermediate product(s)].

[The review statement shall be completed by the reviewer.]

2.5. Geographic validity

This PEFCR is valid for products in scope sold or consumed in the European Union + the UK + EFTA. Each PEF study shall identify its geographical validity listing all the countries where the product object of the PEF study is consumed/sold with the relative market share. In case the information on the market for the specific product object of the study is not available, Europe + UK + EFTA shall be considered as the default market, with an equal market share for each country.

2.6. Language

The PEFCR is written in English. The original in English supersedes translated versions in case of conflicts.

2.7. Conformance to other documents

This PEFCR has been prepared in conformance with the following documents (in prevailing order):

- *Product Environmental Footprint (PEF) method*
- *....*

[The PEFCR shall list additional documents, if any, with which the PEFCR is in conformance with.]

Note	The PEFCR does not currently conform to any other documents than the PEF method. This section will be completed at a later date if required.

3. PEFCR scope

[This section shall i) include a description of the scope of the PEFCR, ii) list and describe the sub-categories included in the PEFCR (if any), describe the product(s) in scope and the technical performance]

The product category for this PEFCR is apparel and footwear, which is defined as follows:

- **An apparel or footwear product to meet the consumer's specific needs, as defined per sub-category**

The full life cycle (cradle to grave) for apparel and footwear sold in the EU market is within the scope of this PEFCR. Additionally, this PEFCR could also be used to assess partial life cycle impacts of products included in this category.

Thirteen different sub-categories are included in this PEFCR as described in Table 5.

Workwear is only partially included in the scope:

- Uniforms (e.g. for airline crew, hotel staff, etc.) should be modelled using the most relevant product category from Table 5;
- Protective wear is not in scope as its main protective function will require different materials, processes, testing etc.

Protective wear is defined as designed to be worn by an individual for protection against one or more health and safety hazards (interpretation from ISO45005).

3.1. Product classification

The CPA/NACE codes for the products included in this PEFCR are provided in Table 4 below. Please note that this table is only indicative.

[Based on the product category/sub-category, provide the corresponding Classification of Products by Activity (CPA) (based on the latest CPA list version available). Where multiple production routes for similar products are defined using alternative CPAs, the PEFCR shall accommodate all such CPAs. Identify the sub-categories not covered by the CPA, if any.]

394 Table 4 CPA/NACE codes per product sub-category

Product sub-category	CPA/NACE code
1. T-shirts	14.14.30 T-shirts, singlets and other vests, knitted or crocheted
	14.14.22 Men's or boys' singlets and other vests, underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns, of textile fabric not knitted or crocheted
	14.14.24 Women's and girls' singlets and other vests, slips, petticoats, briefs, panties, nightdresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, of textile fabric not knitted or crocheted
2. Shirts and blouses	14.14.11 Men's or boys' shirts, knitted or crocheted
	14.14.13 Women's or girls' blouses, shirts and shirt- blouses, knitted or crocheted
	14.14.21 Men's or boys' shirts, of textile fabric not knitted or crocheted
	14.14.22 Men's or boys' singlets and other vests, underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns, of textile fabric not knitted or crocheted
	14.14.23 Women's or girls' blouses, shirts and shirt- blouses, of textile fabric not knitted or crocheted
	14.14.24 Women's and girls' singlets and other vests, slips, petticoats, briefs, panties, nightdresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, of textile fabric not knitted or crocheted
3. Sweaters and midlayers	14.19.12 Tracksuits, ski suits, swimwear and other garments, knitted or crocheted
	14.39.10 Jerseys, pullovers, cardigans, waistcoats and similar articles, knitted or crocheted
4. Jackets and coats	14.12.11 Men's ensembles, jackets and blazers, industrial and occupational
	14.12.21 Women' s ensembles, jackets and blazers, industrial and occupational
	14.13.11 Men's or boys' overcoats, car coats, capes, cloaks, anoraks, windcheaters, wind-jackets and similar articles, knitted or crocheted
	14.13.12 Men's or boys' suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches and shorts, knitted or crocheted
	14.13.13 Women's or girls' overcoats, car coats, capes, cloaks, anoraks, windcheaters, wind-jackets and similar articles, knitted or crocheted
	14.13.14 Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, bib and brace overalls, breeches and shorts, knitted or crocheted
	14.13.21 Men's or boys' overcoats, raincoats, car coats, capes, cloaks, anoraks, wind-cheaters, wind- jackets and similar articles of textile fabrics, not knitted or crocheted
	14.13.22 Men's or boys' suits and ensembles of textile fabrics, not knitted or crocheted
	14.13.23 Men's or boys' jackets and blazers, of textile fabrics, not knitted or crocheted
	14.13.31 Women's or girls' overcoats, car coats, capes, cloaks, anoraks, wind-cheaters, wind-jackets and similar articles of textile fabrics, not knitted or crocheted
	14.13.32 Women's or girls' suits and ensembles of textile fabrics, not knitted or crocheted
	14.13.33 Women's or girls' jackets and blazers of textile fabrics, not knitted or crocheted
	14.14.22 Men's or boys' singlets and other vests, underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns, of textile fabric not knitted or crocheted

Product sub-category	CPA/NACE code
	14.14.24 Women's and girls' singlets and other vests, slips, petticoats, briefs, panties, nightdresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, of textile fabric not knitted or crocheted
	14.14.30 T-shirts, singlets and other vests, knitted or crocheted
	14.19.12 Tracksuits, ski suits, swimwear and other garments, knitted or crocheted
5. Pants and shorts	14.12.11 Men's ensembles, jackets and blazers, industrial and occupational
	14.12.12 Men's trousers, bib and brace overalls, breeches and shorts, industrial and occupational
	14.12.21 Women' s ensembles, jackets and blazers, industrial and occupational
	14.12.22 Women's trousers, bib and brace overalls, breeches and sorts, industrial and occupational
	14.13.12 Men's or boys' suits, ensembles, jackets, blazers, trousers, bib and brace overalls, breeches and shorts, knitted or crocheted
	14.13.14 Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, bib and brace overalls, breeches and shorts, knitted or crocheted
	14.13.22 Men's or boys' suits and ensembles of textile fabrics, not knitted or crocheted
	14.13.24 Men's or boys' trousers, bib and brace overalls, breeches and shorts of textile fabrics, not knitted or crocheted
	14.13.32 Women's or girls' suits and ensembles of textile fabrics, not knitted or crocheted
	14.13.35 Women's or girls' trousers, bib and brace overalls, breeches and shorts of textile fabrics, not knitted or crocheted
	14.14.22 Men's or boys' singlets and other vests, underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns, of textile fabric not knitted or crocheted
	14.14.24 Women's and girls' singlets and other vests, slips, petticoats, briefs, panties, nightdresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, of textile fabric not knitted or crocheted
	14.19.12 Tracksuits, ski suits, swimwear and other garments, knitted or crocheted
	14.19.22 Tracksuits, ski suits and swimwear; other garments of textile fabric, not knitted or crocheted
6. Dresses, skirts and jumpsuits	14.12.11 Men's ensembles, jackets and blazers, industrial and occupational
	14.12.21 Women' s ensembles, jackets and blazers, industrial and occupational
	14.13.14 Women's or girls' suits, ensembles, jackets, blazers, dresses, skirts, divided skirts, trousers, bib and brace overalls, breeches and shorts, knitted or crocheted
	14.13.22 Men's or boys' suits and ensembles of textile fabrics, not knitted or crocheted
	14.13.32 Women's or girls' suits and ensembles of textile fabrics, not knitted or crocheted
	14.13.34 Women's or girls' dresses, skirts and divided skirts of textile fabrics, not knitted or crocheted
	14.14.12 Men's or boys' underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns and similar articles, knitted or crocheted
	14.14.14 Women's or girls' slips, petticoats, briefs, panties, nightdresses, pyjamas, dressing gowns, negligees, bathrobes and similar articles, knitted or crocheted
	14.14.22 Men's or boys' singlets and other vests, underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns, of textile fabric not knitted or crocheted

Product sub-category	CPA/NACE code
	14.14.24 Women's and girls' singlets and other vests, slips, petticoats, briefs, panties, nightdresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, of textile fabric not knitted or crocheted
7. Leggings, stockings, tights and socks	14.31.10 Panty hose, tights, stockings, socks and other hosiery, knitted or crocheted
	15.20.40 Parts of footwear of leather; removable insoles, heel cushions and similar articles; gaiters, leggings and similar articles, and parts thereof
8. Underwear	14.14.12 Men's or boys' underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns and similar articles, knitted or crocheted
	14.14.14 Women's or girls' slips, petticoats, briefs, panties, nightdresses, pyjamas, dressing gowns, negligees, bathrobes and similar articles, knitted or crocheted
	14.14.22 Men's or boys' singlets and other vests, underpants, briefs, nightshirts, pyjamas, bathrobes, dressing gowns, of textile fabric not knitted or crocheted
	14.14.24 Women's and girls' singlets and other vests, slips, petticoats, briefs, panties, nightdresses, pyjamas, negligees, bathrobes, dressing gowns and similar articles, of textile fabric not knitted or crocheted
	14.14.25 Brassieres, girdles, corsets, braces, suspenders, garters and similar articles and parts thereof, whether or not knitted or crocheted
9. Swimwear	14.19.12 Tracksuits, ski suits, swimwear and other garments, knitted or crocheted
	14.19.22 Tracksuits, ski suits and swimwear; other garments of textile fabric, not knitted or crocheted
10. Apparel accessories	14.14.25 Brassieres, girdles, corsets, braces, suspenders, garters and similar articles and parts thereof, whether or not knitted or crocheted
	14.19.13 Gloves, mittens and mitts, knitted or crocheted
	14.19.19 Other made-up clothing accessories and parts of garments or of clothing accessories, knitted or crocheted
	14.19.23 Handkerchiefs, shawls, scarves, veils, ties, cravats, gloves and other made-up clothing accessories; parts of garments or of clothing accessories, of textile fabric, not knitted or crocheted, n.e.c.
	14.19.31 Clothing accessories of leather or of composition leather, expect sports gloves
	14.19.41 Hat forms, hat bodies and hoods of felt; plateaux and manchons of felt; hat shapes, plaited or made by assembling strips of any material
	14.19.42 Hats and other headgear, of felt, or plaited or made by assembling strips of any material, or knitted or crocheted or made up from lace or other textile fabric in the piece; hairnets
	22.29.10 Apparel and clothing accessories (including gloves), of plastics
11. Open-toed shoes	15.20.12 Footwear with outer soles and uppers of rubber or plastics, other than waterproof or sports footwear
	15.20.13 Footwear with uppers of leather, other than sports footwear, footwear incorporating a protective metal toe-cap and miscellaneous special footwear
	15.20.14 Footwear with uppers of textile materials, other than sports footwear

Product sub-category	CPA/NACE code
	15.20.23 Footwear with uppers of leather, other than sports footwear, footwear incorporating a protective metal toe-cap and miscellaneous special footwear
	15.20.32 Wooden footwear, miscellaneous special footwear and other footwear n.e.c.
12. Closed-toed shoes	15.20.12 Footwear with outer soles and uppers of rubber or plastics, other than waterproof or sports footwear
	15.20.13 Footwear with uppers of leather, other than sports footwear, footwear incorporating a protective metal toe-cap and miscellaneous special footwear
	15.20.14 Footwear with uppers of textile materials, other than sports footwear
	15.20.23 Footwear with uppers of leather, other than sports footwear, footwear incorporating a protective metal toe-cap and miscellaneous special footwear
	15.20.32 Wooden footwear, miscellaneous special footwear and other footwear n.e.c.
	15.20.11 Waterproof footwear, with outer soles and uppers of rubber or plastics, other than footwear incorporating a protective metal toe-cap
	15.20.21 Tennis shoes, basketball shoes, gym shoes, training shoes and the like
	15.20.29 Other sports footwear, except snow-ski footwear and skating boots
	15.20.31 Footwear incorporating a protective metal toe-cap
13. Boots	15.20.11 Waterproof footwear, with outer soles and uppers of rubber or plastics, other than footwear incorporating a protective metal toe-cap
	15.20.12 Footwear with outer soles and uppers of rubber or plastics, other than waterproof or sports footwear
	15.20.13 Footwear with uppers of leather, other than sports footwear, footwear incorporating a protective metal toe-cap and miscellaneous special footwear
	15.20.14 Footwear with uppers of textile materials, other than sports footwear
	15.20.21 Tennis shoes, basketball shoes, gym shoes, training shoes and the like
	15.20.23 Footwear with uppers of leather, other than sports footwear, footwear incorporating a protective metal toe-cap and miscellaneous special footwear
	15.20.29 Other sports footwear, except snow-ski footwear and skating boots
	15.20.31 Footwear incorporating a protective metal toe-cap

The following codes apply to several product categories and have not been added to this table, but are included in this PEFCR:

- 14.11.10 Apparel of leather or of composition of leather
- 14.19.11 Babies' garments and clothing accessories, knitted or crocheted
- 14.19.21 Babies' garments and clothing accessories, of textile fabric, not knitted or crocheted
- 14.19.32 Garments made up of felt or non-wovens, textile fabrics impregnated or coated

- 14.20.10 Articles of apparel, clothing accessories and other articles of fur skin, except headgear

3.2. Representative products

[The PEFCR shall include a description of the representative product(s) and how it has been derived. The TS shall provide in an Annex to the PEFCR information about all the steps taken to define the "model" of the RP(s) and report the information gathered].

The PEF study of the representative products (PEF-RP) is available upon request to the TS coordinator that has the responsibility of distributing it with an adequate disclaimer about its limitations.

The product category includes apparel and footwear products sold in Europe.

This PEFCR covers 13 virtual representative products per the products sub-categories defined in Table 5 below. ANNEX IV – Designing the representative product model, describes the steps taken to define the RP model.

Table 5 Product sub-categories and descriptions

No.	Sub-category/ representative product	Typical products included	Description and intended function
1	T-shirts	Singlets, t-shirts, polo shirts, other short-sleeved shirts	Garment to cover the upper body to the elbow
2	Shirts and blouses	Long-sleeved shirts, blouses, tunics, base layers	Garment to cover the upper body including the entire arm
3	Sweaters and midlayers	Pullovers, cardigans, hoodies, jerseys, sweatshirts, knitted and wool sweaters, vests	Garment to keep the upper body warm and covered
4	Jackets and coats	Blazers, suit jackets, overcoats, other light jackets, rain jackets, outdoor winter jackets, parkas, down jackets, fur jackets, outdoor vests, leather jackets	Garment to put on top of a shirt or sweater or to protect from the elements
5	Pants and shorts	Casual pants, outdoor pants, dress pants, jeans, sports pants, capri pants, shorts	Garment to cover the lower body, may protect from the elements
6	Dresses, skirts and jumpsuits	Short- and long-sleeved, strapless, wrap, long and short, one-piece suits	One-piece garment that covers both the upper and lower body, or the lower body only, other than pants and shorts
7	Leggings, stockings, tights and socks	Opaque and sheer tights, pantyhose, fishnets, ankle socks, knee socks, low-cut socks	Tight garment to cover the legs and/or feet

No.	Sub-category/ representative product	Typical products included	Description and intended function
8	Underwear	Boxers, briefs, panties, bras, body-shaping suits	Garment worn under clothes, often next to the skin of the upper or lower body
9	Swimsuits	Bikinis, bathing suits, racing-style swimwear, board shorts	Garment worn for water-based or sun-based activities
10	Apparel accessories	**Hats:** Caps, flat caps, woollen hats/beanies, fedoras, panamas, bowlers, newsboys, berets	Garment to cover the head
		Scarves and ties: Warm and light scarves, buffs, neckerchiefs, headscarves, shawls, bowties	Garment worn around the neck
		Belts: Dress belts, casual belts, buckle belts, tie-up belts, suspenders	Flexible band or strap worn around the waist or over the shoulders used to secure or to hold up clothing such as pants
		Gloves and mittens: fingerless gloves, fashion gloves, outdoor sports gloves, mittens	Articles of clothing that protect hands and wrists from the elements. Used in pairs.
11	Open-toed shoes	Flip-flops, casual /fashion sandals, sports sandals, slippers	Open-toed shoes, providing protection from the ground. Used in pairs.
12	Closed-toed shoes	Slippers, tennis shoes, moccasins, espadrilles, sneakers, cleats, athletic shoes, dress shoes, protective toecap – toed shoes	Closed-toed shoes, providing protection from the ground. They may protect against water, the elements and/or heavy objects. Used in pairs.
13	Boots	Polymer boots, winter boots, hiking boots, dress boots, protective toecap - toed boots	Boots that cover the ankle, providing protection from the ground. They may protect against water, the elements, heavy objects and/or ankle injuries. Used in pairs.

3.3. Functional unit and reference flow

[The PEFCR shall describe (i) how each aspect of the functional unit affects the environmental footprint of the product, (ii) how to include this effect in the EF calculations and (iii) how an appropriate reference flow shall be calculated. In case calculation parameters are needed, the PEFCR shall provide default values or shall request these parameters in the list of mandatory company-specific information. A calculation example shall be provided].

The functional unit (FU) is to provide an apparel or footwear product to meet the consumer's specific needs, as defined per sub-category. Table 6 below defines the key aspects used to define the FU.

Table 6 Key aspects to determine the unit of analysis

Aspect	Aspect detail	Description
What?	Function provided	To provide an apparel or footwear product to meet the consumer's needs, as defined per sub-category in Table 5.
How much?	Magnitude of the function	One apparel product, one pair of socks or one pair of footwear as defined by a bill of materials.
How well?	Expected level of quality	Wear in good condition with appropriate use for the given product, as defined per sub-category in Section 3.3.3.1.
How long?	Duration of the product provided	One use which includes aspects such as duration of service, or lifetime, care cycles per lifetime and quality, as defined per sub-category.

The consumers' needs can vary quite widely for an apparel or footwear product, for example including sports, leisure, work, protection from the elements, or simply to allow the consumer to express him or herself.

A use is defined as a 24-hour period, regardless of how many hours the apparel or footwear product is worn within this 24-hour period. A use may not always include a washing step as some products only require washing after a few uses as described in Table 37. Both the "how well" and "how long" aspects will be dependent on the quality of the product. With an extended lifetime, the impact of the use stage could be higher (e.g. more washes), however the impact of the production stage will be lower per use. Products that fail to meet baseline quality requirements will have a higher overall impact. See Section 3.3.3.1. for more information.

The average product lifetime per sub-category is defined in Section 3.3.2.

The reference flow is the amount of product needed to fulfil the defined function and shall be measured in the fraction of the life cycle of the specific apparel or footwear product studied.

For example, for a t-shirt with a lifetime of 45 uses, the reference flow will be $1/45^{th}$ of the t-shirt.

All quantitative input and output data collected in the study shall be calculated in relation to this reference flow.

Note	As indicated in the PEF method, i*f the product lifetime is extended into a product with original product specifications (providing the same function) these processes shall be included in the FU and reference flow. […]The user of the PEF method shall describe how reuse or refurbishment is included in the calculations of the reference flow and the full life cycle model, taking into account the "how long" of the FU.*

3.3.1. Guidance on sizing

When calculating a product environmental footprint, companies and users shall base the calculations on he following sizes, based on TS expertise:

- Infants: (0 to 2 years): size 1 year (68 cm)
- Children (2 to 8 years): size 6 years (104 cm)
- Children (8 to 14 years): size 10 years (140 cm)
- Women: size 38
- Men: size 50
- Mixed: size 40

For footwear, the following medium sizes shall be used:

- Infants: size 21
- Children: size 32
- Women: size 37
- Men: size 42
- Unisex - 39

These European sizes have been selected to provide a common reference point for the calculations.

For products not manufactured in the sizes above (e.g. plus size ranges or bras), calculations shall be made using the weighted average size for the apparel or footwear product studied.

As detailed in Table 6, a product is defined by a bill of materials, which accounts for multiple sizes using the concept of grading. Material consumption is not tied to the product net weight, but to the bill of materials consumption, which also includes other processing losses beyond patterning.

Additionally, sizing is irrelevant as a product differentiator since a consumer will need to buy the size that fits them.

3.3.2. Product lifetime

3.3.2.1. Introduction

In this PEFCR, the focus is on:

i) the intrinsic quality of the product and its materials, as measured with standardized physical tests (see Section 3.3.3.1);

ii) the repairability potential of the product; and

iii) design and other non-physical aspects.

The multipliers included in this section can be combined should the product qualify both for an intrinsic durability multiplier and a repairability multiplier.

For example, for a t-shirt qualifying for an intrinsic quality multiplier of 1.17 and a repairability multiplier of 1.05, the combined lifetime multiplier becomes 1.17*1.05 = 1.23.

Note	In the present draft, only the methodology to address aspects i) and ii) is described. The criteria and multipliers for iii) will be updated in the next version (v2.0) of the PEFCR if the TS successfully designs a methodology.

For the lifetime, the concept of the "duration of service" from the Higg Product Module (PM) methodology is used where the duration of service is defined as *"the lifetime of the product with appropriate use for its intended function".* The product's intended function is described in Table 5. A product is used "appropriately" when it is used according to its intended function (e.g. if a hat is used as a sock, its duration of service may vary).

According to this definition, the default duration of service is independent from the number of users. For example, by default, a t-shirt will be used 45 times in its lifetime, which could be:

- 45 uses with the same user;
- 20 uses with a first user, and 25 uses with a second user after the t-shirt has been donated for reuse.

Quality tests and thresholds as well as possible further requirements are used to define the Duration of Service Factor (DoS Factor), or lifetime multiplier. The default duration of service as given in Section 3.3.2.2 can therefore be multiplied by a DoS factor depending on certain criteria described in Section 3.3.3.

3.3.2.2. Default duration of service

Table 7 below lists the number of uses per product sub-category based on SAC (2020) for apparel, and expert judgement for footwear. The presented default lifetime shall only be modified by the multipliers presented in Section 3.3.3.

Table 7 Default product duration of service per product sub-category

No.	Product sub-category	Product	Number of uses per product duration of service
1	T-shirts	Average	45[1]
2	Shirts and blouses	Average	40
3	Sweaters and midlayers	Average	85
4	Jackets and coats	Average	100
5	Pants and shorts	Average	70
6	Dresses, skirts and jumpsuits	Average	70
7	Leggings, stockings, tights and socks	Average	55
		Leggings/tights	70
		Hosiery	50
		Socks	50
8	Underwear	Average	60
9	Swimwear	Average	30
10	Apparel accessories	Average	100
11	Open-toed shoes	Average	50
12	Closed-toed shoes	Average	100
13	Boots	Average	100

A duration of service of one use shall be used for items clearly identified as single use items (e.g. “for single use”).

The numbers included above are independent from the number of users. The reuse rate of apparel products is 23%, and 10% for footwear as detailed in Section 5.10. Re-commerce models can extend the average product life by 1.7 times, based on average length of second-

[1] Calculated based on the percentages of the fibre types in the RP.

hand ownership (Cline E., 2019). As a result, the lifetime extension due to reuse would be 16% for apparel products and 7% for footwear. Due to the limited number of robust consumer studies conducted, the numbers included in Table 7 have a high uncertainty. A conservative approach has then been followed and the 1.7 lifetime extension has not been integrated to the default DoS.

Note	This table has been simplified to reflect the uncertainty of the data. It may be updated at a later stage should more data be provided.

3.3.3. Calculation of the specific duration of service

For the determination of the specific duration of service, the default duration of service combined with the corresponding duration of service factors (supported with evidence) shall be used.

3.3.3.1. Requirements regarding intrinsic quality

The intrinsic quality of the product and of its materials and parts, as defined using physical durability standard testing (e.g. dimensional stability, pilling, or colourfastness testing), can have a direct impact on the lifetime of the product. The PEFCR follows a similar method to the one developed for the Higg PM, which combines several tests into one multiplier used to adjust the default lifetime (see examples below).

A product score shall be calculated using the specific requirements provided in Table 45 through Table 68, found in ANNEX V – Detailed requirements regarding intrinsic quality, using any product size.

The score is then converted to an intrinsic quality multiplier to the product's lifetime (number of uses in the functional unit) as presented in Table 8, based on TS expertise:

Table 8 Intrinsic quality multipliers

Score achieved	Intrinsic quality multiplier
0 points / no tests performed	0.67
1 to 3 points	0.84
4 to 7 points	1
8 to 11 points	1.17
12 to 15 points	1.45

The score obtained shall be rounded down to the next whole number.

- The intrinsic quality multiplier shall only be applied to products for which the tables in Annex V apply;
    - If no test is performed, the number of points allocated is 0;
    - For other products such as belts or bras, the multiplier shall be equal to 1.
- The number of tests for each product has been limited to those associated with the most common product failure modes.

Note	A refinement of the requirements might be needed following the Supporting Studies.

Example 1 – knitted shirt with an intrinsic quality multiplier of 1

In this example, a knitted shirt achieved a final score of 6 points, giving it an intrinsic quality multiplier of 1. Using Table 48, the calculation is as follows:

- Piling resistance – 5 points, weighting of 13%;
- Fabric bursting – 5 points, weighting of 13%;
- Fabric colourfastness – 10, 5 and 10 points, weighting of 8%;
- No performance claim;
- Dimensional stability – 10 points, weighting of 20%;
- Appearance – 5 points, weighting of 30%;
- Score = (5*0.13)+(5*0.13)+(10*0.08+5*0.08+10*0.08)+(10*0.2)+(5*0.3) = 6.8 – rounded down to 6 points, multiplier of 1.

Table 9 Example of impact for a knitted shirt on climate change, intrinsic quality multiplier = 1

Indicator	Climate change results
Supply chain impacts and end of life stage	14 kg CO_2-eq
Use stage	+ 45 total uses*1 / 2 uses per wash * 0.04 kg CO_2eq
Total (per lifetime)	*=14.8 kg CO_2eq*
Total (per use)	*14.9 kg CO_2eq / (45 total uses *1 for the intrinsic quality multiplier)* *= 0.33 kg CO_2eq*

Example 2 – t- shirt with an intrinsic quality multiplier of 1.45

In this example, a t- shirt with a wrinkle resistance claim achieved a final score of 12 points, giving it an intrinsic quality multiplier of 1.45. Using Table 46 the calculation is as follows:

- Piling resistance – 15 points
- Fabric bursting – 10 points
- Fabric colourfastness – 10, 15 and 10 points
- Performance claim – 10 points
- Dimensional stability – 10 points
- Appearance – 15 points
- Score = 15*0.1+10*0.1+10*0.05+15*0.05+10*0.05+10*0.15+10*0.2+15*0.3 = 12.25 – rounded down to 12 points

Table 10 Example of impact for a t- shirt on climate change, intrinsic quality multiplier = 1.45

Item	Climate change results
Supply chain impacts and end of life stage	14 kg CO_2eq
Use stage	+ 45 total uses*1.45 / 2 uses per wash * 0.04 kg CO_2eq
Total (per lifetime)	*=15.16 kg* CO_2eq
Total (per use)	*15.31 kg CO_2eq / (45 total uses * 1.45 for the intrinsic quality multiplier) = 0.23 kg CO_2eq*

Suitable proof for meeting requirements can either be development-based where suitable production tolerances have been agreed upon with the manufacturers prior to production, or be production-based. The production tolerances should be in line with the requirements in the corresponding tables in ANNEX V – Detailed requirements regarding intrinsic quality. In-house laboratory testing is allowed if proficiency can be demonstrated for the required tests, meaning the in-house laboratory is in compliance with international certification schemes such as ISO 17025 or equivalent, even if it is not certified.

3.3.3.2. Repair/refurbish

The lifetime of a product can be extended through repair to maintain it in “good condition”. Two aspects are taken into account to define a repairability multiplier:

- The intrinsic repairability of an apparel or footwear product, as in the capacity of a product to be repaired, independently of whether or not the repair will actually happen (promoting ecodesign practices);
- The existence of an after-sales service for repair, and its quality.

Product failures which are not economically repairable and repairs that can be done by the consumer at home without additional support (included as maintenance in the use stage such as re-waterproofing a jacket) are excluded from the repairability multiplier.

For each product sub-category, the primary failure modes leading to a potential repair have been identified and given a Relative Weight (RW) based on how usable the product would be if this feature failed. Criteria affecting the repairability multiplier have been designed to reflect the likelihood that the product will be repaired and have its lifetime extended by the average consumer. Detailed tables can be found in ANNEX VI – Detailed requirements regarding repairability.

The criteria which affect the repairability multiplier are consistent across the different product categories:

- Repair documentation (D) - includes any documentation that facilitates the type of repair for that product and is accessible with the product information. This can be generalized repair documentation or detailed repair documentation. To be considered detailed, the repair guide must be specific for the type of product or material. For example, a generalized repair guide will only indicate how to replace a zipper, whereas a specific repair documentation will indicate the part number, colour, or any other specific reference.
- Repair services offered (S) - Taking into account the share of markets where the repair services are available.
- Price of repair (P) – Customer mailing fees shall be included if the customer is responsible for paying for shipping back to the repair facility.

- Repair Warranty Period (W) – this is the length of time that the brand /retailer will stock and provide parts and services to repair the specific product. This is different from a full product replacement warranty.

Where these parameters vary by country, the criteria shall be assessed for at least 80% of the sales locations for any given product.

For example, if detailed repair services are provided in 90% of the sales locations, then the answer to the "repair services" criteria would be "yes".

If repair services are provided in 70% of the sales locations however, the answer to the "repair services" criteria would be "no".

Third-party repair service partnerships can qualify for the repairability multiplier, however in this case, all criteria shall be assessed with these partnerships in mind. For instance, if a third-party repair service is considered to be part of a brand's repair services but no repair documentation is provided to the service provider, then the repair documentation question must be answered as "not available".

Table 11 Repairability multipliers

% Achieved	Repairability multiplier
0-25 %	1
26-50 %	1.05
51-75 %	1.1
76-100%	1.15

Calculations

The Failure Mode Reparability Score of each of the listed features (e.g. button, zipper or snaps) of the product shall be evaluated using Table 69 to Table 81.

<u>Illustrative example</u>

For example, for a sweater with a zipper and snaps, using Table 71:

- For the zipper:
  - Detailed documentation has been provided – D=1
  - Repair services are offered – S = 1
  - The repair is free – P=1

- The warranty period is of 10 years – W=1
- As a result, the failure mode reparability score for the zipper is (1+1+1+1)*50 = 200 points

- For the snaps:
  - Detailed documentation has been provided – D=1
  - No repair services are offered meaning S=0 and P=0
  - Snaps for this product will be available for 5 years – W= 0.5
  - As a result, the failure mode reparability score for the snaps is (1+0+0+0.5)*25 = 37.5 points
- The Overall Product Score (OPS) for the entire garment is 200+37.5 = 237.5 points
- The Maximum Product Score (MPS) of the garment is the sum of the max failure score for both the zipper and the snaps, without buttons, so 200+100 = 300
- The total product repairability percentage is then (237.5/300)*100 = 79%
- As a result, using Table 11, the repairability multiplier for this product is 1.15.

Note	*This section is under development and requires testing to confirm:* *(i) the list of product failure modes;* *(ii) the criteria to evaluate the quality of repair; and* *(iii) the repairability lifetime multipliers.* *This section will be updated after the supporting studies.*

3.4. System boundaries

[This section shall include a system diagram clearly indicating the processes and life cycle stages that are included in the product category/sub-category. A short description of the processes and life cycle stages shall be provided. The diagram shall include an indication of the processes for which company-specific data are required and the processes excluded from the system boundary.]

651 The following life cycle stages and processes shall be included in the system boundary*:* the
652 entire life cycle (from cradle to grave) of apparel and footwear products including the raw
653 material production (including packaging), manufacturing, distribution, use and end-of-life
654 life cycle stages. The system boundaries are shown in Figure 1 for apparel and Figure 2 for
655 footwear. The main processes for each life cycle stage are also indicated below.

Note	Requirements for company-specific data will be added after the data quality requirements have been confirmed in the supporting studies.

656

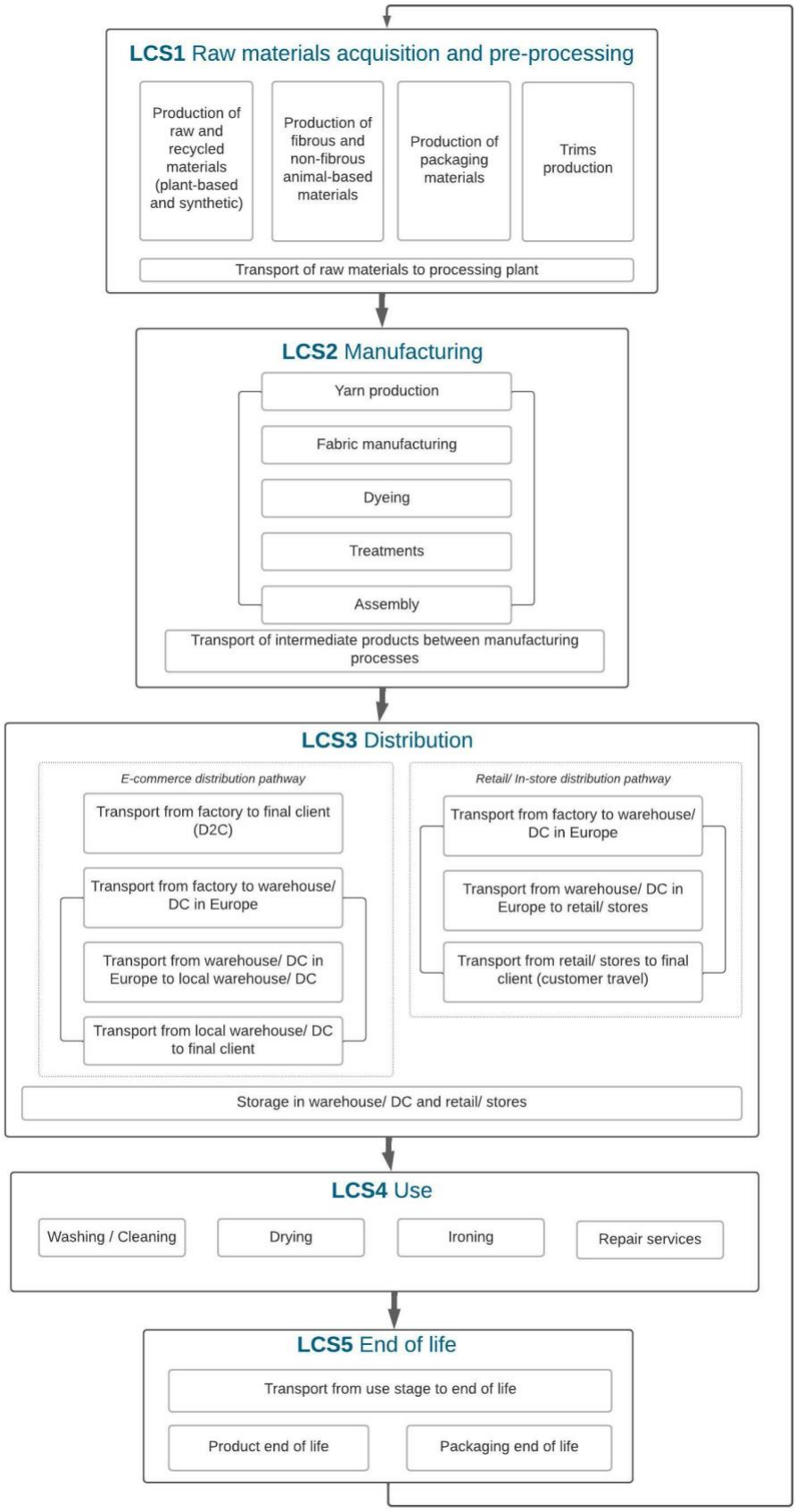


Figure 1 System boundary diagram for apparel

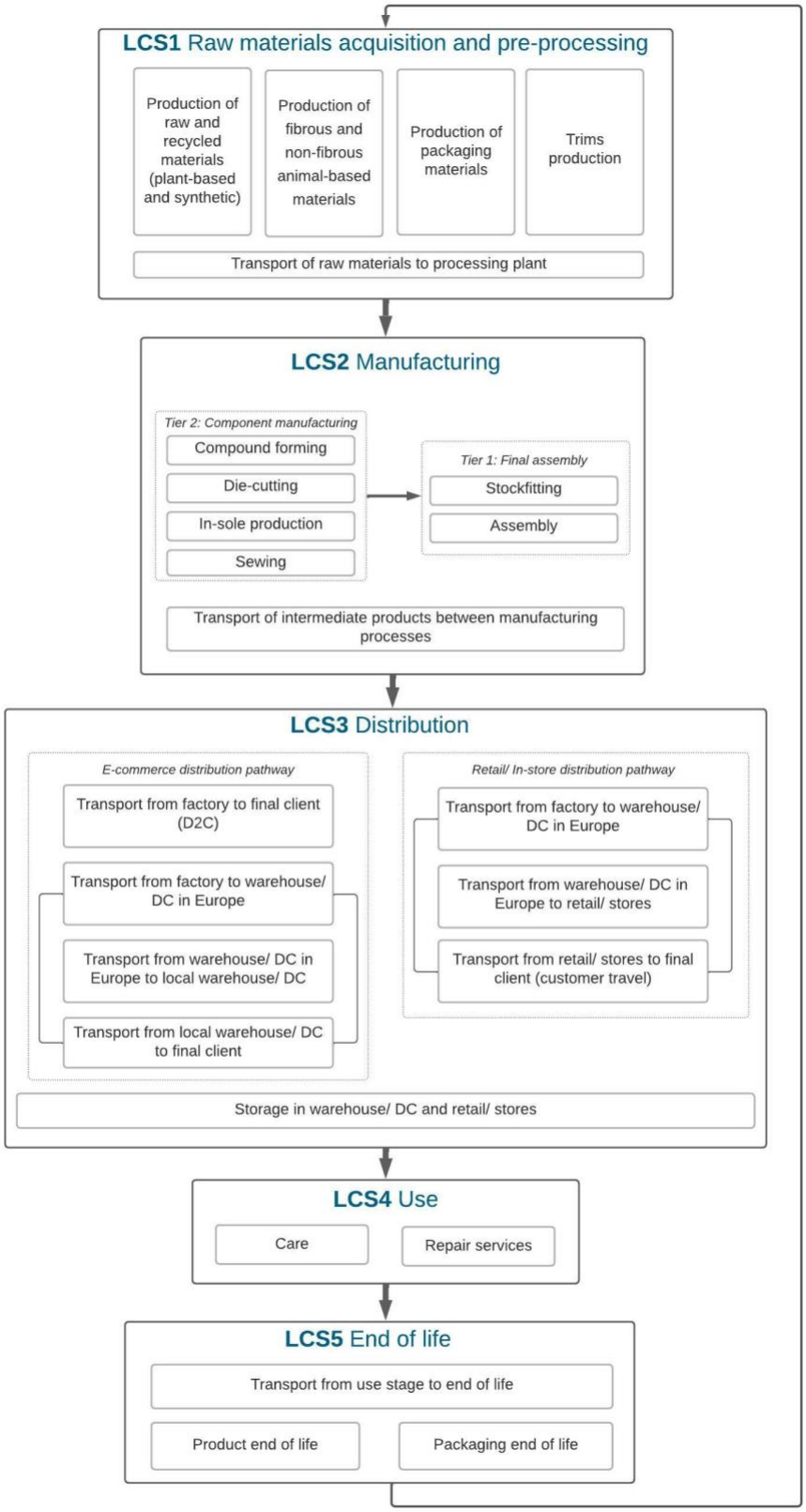


Figure 2 System boundary diagram for footwear

663 Table 12 Processes included per life cycle stage (non-exhaustive list)

Life cycle stage	Short description of the processes included (non-exhaustive list)
LCS1 Raw materials acquisition and pre-processing	• Production or extraction of raw textile, rubber, and plastic materials; fibrous and non-fibrous animal-based materials (including leather materials, tanning and finishing); packaging materials and trims (including buttons, hooks, tags, tapes, toe caps, shoe laces, zippers, zip pullers, as relevant for each subcategory); including the production of filament yarn • Raw material transport to manufacturing plant
LCS2 Manufacturing	Apparel: • Production of yarn through spinning (production of yarn from staple fibres) • Production of knitted fabric (e.g. knitting circular, knitting flat) • Production of woven fabric • Dyeing: Bleaching and dyeing processes • Treatments, both wet and dry (includes finishing) • Assembly (includes sewing) • Any other apparel manufacturing process • Transport of intermediate products between manufacturing processes Footwear: • Compound forming • Die-cutting • In-sole production • Sewing, fusing • Stockfitting • Assembly • Any other footwear manufacturing process • Transport of intermediate products between manufacturing processes
LCS3 Distribution	E-commerce: • Transport from factory to the final client (direct to consumer) • Transport from factory to warehouse/ distribution centre located in Europe • Transport from a warehouse/ distribution centre located in Europe to a local warehouse/ distribution centre • Transport from local warehouse/ distribution centre to final client • Distribution losses and deadstock Retail/ in-store: • Transport from factory to warehouse/ distribution centre located in Europe • Transport from warehouse/ distribution centre located in Europe to retail/ stores • Transport from retail/ stores to final client (consumer travel) • Distribution losses and deadstock
LCS4 Use	Apparel • Washing / cleaning • Drying • Ironing Footwear • Care Both • Repair
LCS5 End of life	• Transportation from user to collection point • Transportation from collection point to sorting point (incl. transport for reuse inside and outside of Europe) • Transportation from sorting point to recycling • Transportation from user to disposal • Recycling, incineration (with and without energy recovery) and landfilling

According to this PEFCR, the following processes may be excluded based on the cut-off rule: [include the list of processes that shall be excluded based on the cut off rule]*. No additional cut-off is allowed. OR According to this PEFCR, no cut-off is applicable.*

Note	Processes to be excluded will be completed after the supporting studies.

Each PEF study done in accordance with this PEFCR shall provide in the PEF study a diagram indicating the activities falling in situation 1, 2 or 3 of the data needs matrix (see Section 5.4*).*

3.5. List of EF impact categories

Each PEF study carried out in compliance with this PEFCR shall calculate the PEF-profile including all EF impact categories listed in the Table below. [The TS shall indicate in the table if the sub-categories for climate change shall be calculated separately. In case one or both sub- categories are not reported on, the TS shall include a footnote explaining the reasons, e.g.: "The sub-indicators 'Climate change – biogenic' and 'Climate change - land use and land transformation' shall not be reported separately because their contribution to the total climate change impact, based on the benchmark results, is less than 5% each."]

Note	The information on the climate change sub-categories will be completed following the supporting studies.

Table 13 Impact categories for the PEF profile

EF impact category	Impact indicator	Unit	Characterization model
Climate change	Radiative forcing as Global Warming Potential (GWP100)	kg CO_2-eq	Baseline model of 100 years of the Intergovernmental Panel on Climate Change (IPCC) (based on IPCC 2013)
- Climate change – fossil			
- Climate change-biogenic			
- Climate change – land use and land use change			
Ozone depletion	Ozone Depletion Potential (ODP)	kg CFC-11-eq	Steady-state ODPs as in (WMO 2014 + integrations)
Human toxicity, cancer	Comparative Toxic Unit for humans (CTUh)	CTUh	USEtox model 2.1 (Fantke et al, 2017)
Human toxicity, non-cancer	Comparative Toxic Unit for humans (CTUh)	CTUh	USEtox model 2.1 (Fantke et al, 2017)
Particulate matter	Impact on human health	disease incidence	PM method recommended by UNEP (UNEP, 2016)

EF impact category	Impact indicator	Unit	Characterization model
Ionising radiation, human health	Human exposure efficiency relative to U235	kBq U^{235} -eq	Human health effect model as developed by Dreicer et al., 1995 (Frischknecht et al, 2000)
Photochemical ozone formation, human health	Tropospheric ozone concentration increase	kg NMVOC -eq	LOTOS-EUROS model (Van Zelm et al, 2008) as implemented in ReCiPe 2008
Acidification	Accumulated Exceedance (AE)	mol H^+ -eq	Accumulated Exceedance (Seppälä et al. 2006, Posch et al, 2008)
Eutrophication, terrestrial	Accumulated Exceedance (AE)	mol N -eq	Accumulated Exceedance (Seppälä et al., 2006, Posch et al, 2008)
Eutrophication, freshwater	Fraction of nutrients reaching freshwater end compartment (P)	kg P -eq	EUTREND model (Struijs et al, 2009) as implemented in ReCiPe
Eutrophication, marine	Fraction of nutrients reaching marine end compartment (N)	kg N -eq	EUTREND model (Struijs et al, 2009) as implemented in ReCiPe
Ecotoxicity, freshwater	Comparative Toxic Unit for ecosystems (CTUe)	CTUe	USEtox model 2.1 (Fantke et al, 2017)
Land use	• Soil quality index (dimensionless) • Biotic production (kg biotic production) • Erosion resistance (kg soil) • Mechanical filtration (m^3 water) • Groundwater replenishment (m^3 groundwater)	Dimensionless (pt)	Soil quality index based on LANCA (Beck et al. 2010 and Bos et al. 2016)
Water use	User deprivation potential (deprivation- weighted consumption)	m^3 world -eq	Available WAter REmaining (AWARE) as recommended by UNEP, 2016
Resource use[2], minerals and metals	Abiotic resource depletion (ADP ultimate reserves)	kg Sb -eq	CML 2002 (Guinée et al., 2002) and (van Oers et al., 2002).
Resource use, fossils	biotic resource depletion – fossil fuels (ADP-fossil)	MJ	CML 2002 (Guinée et al., 2002) and (van Oers et al., 2002)

The full list of normalisation factors and weighting factors are available in ANNEX I - List of EF normalisation and weighting factors*. The full list of characterization factors is available at this link* http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml*.* [The TS shall specify the EF reference package that shall be used.]

[2] *The results of this impact category shall be interpreted with caution, because the results of ADP after normalization may be overestimated. The European Commission intends to develop a new method moving from depletion to dissipation model to better quantify the potential for conservation of resources.*

3.6. Additional technical information

[The TS shall list the additional technical information to be reported]:

Note	No additional technical information currently needs to be reported. This section will be completed at a later stage if necessary.

3.7. Additional environmental information

[Specify which additional environmental information shall/should be reported (provide units). Avoid if possible the use of should. Reference all methods used to report additional information.]

Additional environmental information may include the following (non-exhaustive list):

- Corporate level - Information regarding the company's work with environmental responsibility, such as which initiatives the company has joined (e.g. reporting to CDP), or data about specific environmental characteristics of the product;
- Product level – Information on any sustainability programs followed at product or production level, and share or product or production covered (e.g., percentage of cardboard from a certified source or percentage of textiles from certified labels (e.g. OEKO-TEX® MADE IN GREEN or ZDHC's MRSL compliance).
- Biodiversity is relevant for each product sub-category in scope of the PEFCR based on TS expert judgement. To assess and report impacts on biodiversity, an organic certification system for natural fibres may be used as a proxy. The PEFCR applicant shall report whether any of the materials are certified as organic and report the total mass percentage of the product that is certified organic.

Note	Additional environmental information does not impact calculations. This list will be updated regularly as required. The TS is currently defining how to best address microplastics, references to this issue have been removed from this draft but will be reintroduced in a future version.

3.8. Limitations

[This section shall include the list of limitations a PEF study will have, even if carried out in accordance with this PEFCR.]

The following limitations shall be included in the PEF study report when conducting PEF studies in accordance with this PEFCR:

- Microplastic leakage is often associated with the production, use and end-of-life stages of apparel and footwear products. Microplastics are not covered by the PEF methodology because the impact assessment methods do not yet exist.
- Because the PEF methodology is product- and not user- centric, this PEFCR does not allow for differentiation between the impact of a new or secondhand item.
- The duration of service of items is included in this PEFCR, but the methodology to measure the duration of service is highly debated and may be refined in the future. Non-physical durability attributes such as design (use of adjustable design features such as adjustable waist, enabling detaching and replacing parts such as pockets), or making the garment fit for different purposes, which may have an impact on how long a single user will use a product, are not included in this PEFCR at this stage, however the TS is investigating how to include it in a future version.
- Toxicity aspects are measured with the LCIA method USEtox, which includes human toxicity (cancer and non-cancer effects) and freshwater ecotoxicity, but no marine water or terrestrial ecotoxicity for the moment. This method therefore does not cover the full impacts of chemicals on humans and ecosystems, which are covered by chemical legislation and other methodologies in Europe.

This PEFCR has a time validity of [X years, to be determined]. Updates may be conducted earlier should any key limitation need to be resolved, key technologies change (e.g. recycling), or should better data be made available to inform the default product duration of service per product sub-category (see Table 7).

Note	Time validity of the PEFCR to be completed for the final version of the PEFCR, currently expected in Q3 2023.

3.8.1. Comparisons and comparative assertions

[This section shall include the conditions under which a comparison or comparative assertion may be made.]

Note	Conditions under which a comparison or comparative assertion may be made to be completed for the final PEFCR, expected in Q3 2023.

3.8.2. Data gaps and proxies

[This section shall include:

- The list of data gaps on the company-specific data to be collected that most frequently are encountered by companies in the specific sectors and how these data gaps may be solved in the context of the PEF study;
- The list of processes excluded from the PEFCR due to missing datasets that shall not be filled in by the user of the PEFCR;
- The list of processes for which the user of the PEFCR shall apply ILCD-EL compliant proxies.

The TS may decide to indicate in the LCI excel file (see Section 5) for which processes no datasets are available and therefore are considered data gaps and for which processes proxies shall be used.]

Note	Data gaps, excluded processes and proxies to be completed following the supporting studies, and updated as required.

In the future, more primary data related to the lifespan of garments and footwear may be made available to increase the robustness of key parameters such as the number of wears before a care cycle. In the meantime, the default duration of service as described in Section 3.3.3 shall be used.

Significant investments are being made in both the innovation and scalability of apparel and footwear recycling. Several pathways and technologies are in development, but only the recycling pathways currently implemented at scale are considered in this version of the PEFCR.

4. Most relevant impact categories, life cycle stages, processes and elementary flows

Note	All the tables included in this section are based on the PEF-RP study v1.2. They will be updated in the next version of the PEFCR (v2.0), once the PEF-RP study has been updated following the delivery of the EF 3.0 database.

4.1. Most relevant EF impact categories

The most relevant impact categories per product sub- category *are the following, as calculated in the PEF-RP study v1.2:*

Table 14 Most relevant impact categories per RP

Impact category	RP1	RP2	RP3	RP4	RP5	RP6	RP7	RP8	RP9	RP10	RP11	RP12	RP13
Climate change	**22%**	**24%**	**29%**	**28%**	**24%**	**24%**	**25%**	**23%**	**29%**	**21%**	**32%**	**28%**	**30%**
Ozone depletion	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Human toxicity, cancer	1%	1%	0%	0%	1%	1%	1%	1%	0%	1%	2%	1%	2%
Human toxicity, non-cancer	2%	2%	2%	2%	1%	2%	2%	2%	2%	3%	1%	2%	1%
Particulate matter	**6%**	**7%**	**4%**	**6%**	**7%**	**7%**	**7%**	**6%**	**8%**	**7%**	**11%**	**9%**	**10%**
Ionising radiation	1%	1%	0%	0%	1%	1%	1%	1%	1%	0%	1%	0%	1%
Photochemical ozone formation	3%	3%	2%	3%	3%	3%	3%	3%	3%	2%	4%	3%	4%
Acidification	**6%**	**6%**	**4%**	**5%**	**6%**	**6%**	**6%**	**6%**	**6%**	**6%**	**9%**	**8%**	**9%**
Eutrophication, terrestrial	2%	2%	2%	2%	2%	2%	2%	2%	2%	4%	**4%**	**4%**	**5%**
Eutrophication, freshwater	**6%**	**5%**	2%	3%	6%	**5%**	**5%**	**7%**	4%	3%	4%	3%	4%
Eutrophication, marine	3%	3%	4%	3%	3%	3%	3%	3%	2%	**6%**	3%	3%	3%
Ecotoxicity, freshwater	**10%**	**9%**	4%	5%	**9%**	**9%**	**9%**	**10%**	**11%**	**5%**	**8%**	**7%**	**9%**
Land use	1%	1%	**32%**	**19%**	1%	4%	4%	1%	0%	**25%**	1%	**9%**	1%
Water use	**20%**	**16%**	**6%**	**5%**	**15%**	**16%**	**10%**	**18%**	3%	**6%**	1%	3%	1%
Resource use, minerals and metals	4%	5%	2%	**6%**	**6%**	**5%**	**5%**	3%	**9%**	4%	2%	**5%**	**5%**
Resource use, fossils	**14%**	**14%**	**6%**	**11%**	**15%**	**14%**	**16%**	**15%**	**19%**	**9%**	**16%**	**14%**	**15%**
Total most relevant contribution (%)	**83%**	**82%**	**82%**	**80%**	**81%**	**84%**	**83%**	**85%**	**81%**	**84%**	**81%**	**83%**	**83%**

4.2. Most relevant life cycle stages

The most relevant life cycle stages for per product sub-category are the following*, as calculated in the PEF-RP study v1.2*:

Table 15 Most relevant life cycle stage per impact categories per RP

Impact category	RP1	RP2	RP3	RP4	RP5	RP6	RP7	RP8	RP9	RP10	RP11	RP12	RP13
Climate change	1,2,4	1,2	1,2	1,2	1,2	1,2	1,2	2,4	1,2	1,2	1,2	1,2	1,2
Ozone depletion	--	--	--	--	--	--	--	--	--	--	--	--	--
Human toxicity, cancer	--	--	--	--	--	--	--	--	--	--	--	--	--
Human toxicity, non-cancer	--	--	--	--	--	--	--	--	--	--	--	--	--
Particulate matter	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2	1,2
Ionising radiation	--	--	--	--	--	--	--	--	--	--	--	--	--
Photochemical ozone formation	--	--	--	--	--	--	--	--	--	--	--	--	--
Acidification	1,2,4	1,2	1,2	1,2	1,2	1,2	1,2	1,2,4	1,2	1,2	1,2	1,2	1,2
Eutrophication, terrestrial	--	--	--	--	--	--	--	--	--	--	1,2	1,2	1,2
Eutrophication, freshwater	1,2,4	1,2	--	--	--	1,2	2,4	1,2,4	--	--	--	--	--
Eutrophication, marine	--	--	--	--	--	--	--	--	--	1	--	--	--
Ecotoxicity, freshwater	1,2,4	1,2	--	--	1,2,4	1,2	1,2,4	1,2,4	2,4	1,2	1,2	1,2	1,2
Land use	--	--	1	1	--	--	--	--	--	1	--	1	--
Water use	1	1	1	1,2	1	1	1	1	--	1	--	--	--
Resource use, minerals and metals	--	--	--	1,2	1,2	1,2	1,2	--	1,2	--	--	1	1
Resource use, fossils	2,4	1,2	1,2	1,2	1,2,4	1,2	1,2	2,4	1,2	1,2	1,2	1,2	1,2

Note: RP1. T-shirts, RP2. Shirts and blouses, RP 3. Sweaters and midlayers, RP4. Jackets and coats, RP5. Pants and shorts, RP6. Dresses, skirts and jumpsuits, RP7. Leggings, stockings, tights and socks, RP8. Underwear, RP9. Swimsuits, RP10. Apparel accessories, RP11. Open-toed shoes, RP12. Closed-toed shoes, RP13. Boots.

LC1. Raw materials extraction and pre-processing, LCS2. Manufacturing, LCS3. Distribution, LCS4. Use, LCS5. End of life.

4.3. Most relevant processes

The most impacting processes for the product category in scope of this PEFCR are indicated by a cross in the table below, as calculated in the PEF-RP study v1.2: [this table shall be filled in based on the final results of the PEF studies of the representative product(s). Provide one table per sub-category, if appropriate.]

Table 16 Most impacting processes per product sub-category

Process per life cycle stage (LCS)	RP1	RP2	RP3	RP4	RP5	RP6	RP7	RP8	RP9	RP10	RP11	RP12	RP13
LCS1: Raw material acquisition and pre-processing													
Cashmere	--	--	X	X	--	--	--	--	--	--	--	--	--
Cotton	X	X	X	X	X	X	X	X	--	X	--	--	--
Leather	--	--	--	--	--	--	--	--	--	X	X	X	X
Linen	--	X	--	--	X	--	--	--	--	--	--	--	--
Synthetics (others)	--	--	--	--	--	--	X	--	X	--	--	--	--
Polyamide	--	--	--	--	--	--	X	--	X	--	--	--	--
Polyester	--	--	--	X	--	X	X	--	X	--	--	X	X
PTFE	--	--	--	X	--	--	--	--	--	--	--	--	--
Silk	--	--	--	--	--	--	--	--	--	X	--	--	--
Steel	--	--	--	--	--	--	--	--	--	--	--	--	X
Viscose	--	X	--	--	--	X	X	--	--	--	--	--	--
Wool	--	--	X	X	--	--	X	--	--	X	--	X	--
LCS2													
Spinning	X	X	X	--	X	X	X	X	--	--	--	--	--
Knitting	--	--	X	--	--	--	--	--	--	--	--	--	--
Weaving	--	X	--	X	X	X	--	X	X	X	--	--	--
Sole making	--	--	--	--	--	--	--	--	--	--	X	--	--
Die-cutting and sewing	--	--	--	--	--	--	--	--	--	--	X	X	X
Bleaching and dyeing	X	X	X	X	X	X	X	X	X	--	--	--	--
Finishing	X	X	X	X	X	X	X	X	X	X	--	--	--
Assembly	X	X	X	X	X	X	X	X	X	X	X	X	X
LCS4													
Washing	X	X	--	--	X	X	X	X	X	--	--	--	--
Drying	X	--	--	--	X	--	X	X	--	--	--	--	--

Note: RP1. T-shirts, RP2. Shirts and blouses, RP 3. Sweaters and midlayers, RP4. Jackets and coats, RP5. Pants and shorts, RP6. Dresses, skirts and jumpsuits, RP7. Leggings, stockings, tights and socks, RP8. Underwear, RP9. Swimsuits, RP10. Apparel accessories, RP11. Open-toed shoes, RP12. Closed-toed shoes, RP13. Boots.

4.4. Most relevant elementary flows

The most relevant direct elementary flows for the product category in scope of this PEFCR are the following *as calculated in the PEF-RP study* XX [the list shall be provided based on the final results of the PEF studies of the representative product(s). Provide one list per sub-category, if appropriate.]

Note	To be completed based on the last PEF-RP study (v2.0) as an annex to the PEFCR.

5. Life cycle inventory

[The PEFCR shall indicate if sampling is allowed. If the TS allows sampling, the PEFCR shall describe the sampling procedure as described in the PEF method and contain the following sentence:] In case sampling is needed, it shall be conducted as specified in this PEFCR. However, sampling is not mandatory and any user of this PEFCR may decide to collect the data from all the plants or farms, without performing any sampling.

Note	This section will be completed after the supporting studies.

All newly created datasets shall be EF compliant.

5.1. List of mandatory company-specific data

[The TS shall here list the processes to be modelled with mandatory company-specific data (i.e. activity data and direct elementary flows).]

Note	Processes to be modelled with mandatory company-specific data to be updated following the supporting studies.

The following company-specific data shall be collected by companies using this PEFCR, with a data quality rating (DQR) ≤1.5, as calculated using Equation 2 and

Table 18.

The EF3.0 database will provide a large number of relevant datasets. Users of the PEFCR will have to select the most relevant dataset based on primary data (what is actually used for the production of this garment) for LCS1 and LCS2, and use primary data for energy and transport if desired. Companies can also decide to create new EF-compliant datasets fully based on primary data if they wish.

5.1.1. Life cycle stage 1 – Raw materials (except packaging)

Raw materials

Primary data shall be provided for material type and quantity per bill of material including trims and material provenance (transport distance and provenance share). This includes more detailed information such as yarn type (size and construction method), textile formation (average yarn size and textile type - knit/woven/non-woven), and finishing techniques (chemical finishes such as water repellency, stain release, etc as well as mechanical or heat treatments such as calendaring, brushing, shearing, etc) to select the most relevant dataset from the EF3.0 database.

If detailed data are available, regionalized data per country shall be used. In the case of an origin from multiple sources, the weighted average of the different sources shall be used to properly represent the variability. When published data representative of national averages for other EU countries are available, these may also be used, providing they comply with the PEF requirements.

Note	Information on how to pick the best dataset from the EF 3.0 will be provided after the supporting studies.

Raw material transport

There are two possible scenarios for transport of raw materials:

i) In case the exact location of the supplier is known as well as the transport mode (e.g. the specific type of truck, ship and train or plane), the specific data available shall be used.

ii) In case the exact location of the supplier is known as well as the transport mode, but the specific type of truck, ship, train or plane is not known, the specific data available shall be used and the default values (including utilisation ratio) for the transport mode given in Table 31.

For each material transported the following data are required (PEF method):

- Mass transported;
- Transport mode;

- Distance per transport mode;
- Utilisation ratio for truck transport;
- Empty return modelling for truck transport (if not already included in the utilisation rate, for details see Section 6.3.3).

5.1.2. Life cycle stage 2 - Manufacturing

Primary data for processes and technologies shall be used to select the most relevant dataset from the EF 3.0 database. Specific location and loss rates shall be used to edit the datasets (country energy mix as a minimum, specific energy type and amount if data are available).

5.1.3. Life cycle stage 3 - Distribution

Should the company conducting the study exceed the default air cargo distances or provenance by more than 50%, primary data shall be used (more details provided in Section 6.3.1).

5.1.4. Life cycle stage 4 - Use stage

According to the PEFCR for leather (Leather PEFCR, 2020), specific garment use instructions shall be followed for leather and fur products.

5.1.5. Other primary information

Primary data shall be provided for final product weight, deadstock rate and deadstock fate (shares landfilled, incinerated, recycled and associated recycling pathway used). Providing primary information to assess the intrinsic product quality (see Section 3.3.3.1) or repairability (see Section 3.3.3.2) is highly recommended, but not mandatory.

Note	The list of mandatory company-specific data has been shortened in light of the PEF RP-study v1.2 results. Distribution is not a most relevant life cycle stage, but air travel has not been considered in the PEF RP study which could alter the results, meaning this should be tested in the supporting studies. Because consumers do not always follow care instructions, default values shall be used for the use stage. Finally,

	considering the end-of-life stage is almost never most relevant, primary data do not need to be collected.

Process A

[Provide a short description of process "a". List all the activity data and direct elementary flows that shall be collected and the default datasets of the sub-processes linked to the activity data within process "a". Use the table below to introduce minimum one example in the PEFCR. In case not all processes are introduced here, the full list of all processes shall be included in an Excel file.]

Note	The table below is provided as an example for the TS to see what data tables will eventually look like following the supporting studies.

Table 17 Data collection requirements for mandatory process A (dummy example)

Requirements	Data type	Example
For data collection purposes	Activity data to be collected	Technology of the knitting process
	Specific requirements (e.g. frequency, measurement standard, etc.)	Company-specific primary data on the percentage by weight required per FU that are no older than 2 years old
	Energy use	Electricity (in kWh) incl. energy source, heat (in MJ) incl. energy source
	Losses	In %
For modelling purposes	Unit of measure	unit/FU
	Default dataset to be used	to be completed once EF 3.0 is available
	Dataset source (i.e. node)	to be completed once EF 3.0 is available
	UUID	to be completed once EF 3.0 is available
	TiR (average)	to be completed once EF 3.0 is available
	TeR	to be completed once EF 3.0 is available
	GeR	to be completed once EF 3.0 is available
	P	to be completed once EF 3.0 is available
	DQR	to be completed once EF 3.0 is available

Where TeR is technological representativeness, GeR is geographical representativeness, TiR is time representativeness, and P is precision, UUID Universally Unique Identifier, and DQR data quality rating.

[List all the emissions and resources that shall be modelled with company-specific information (most relevant foreground elementary flows) within process "a".]

Note	Company specific data to be collected will be provided as an Excel file in an appendix. See Table 17 as an example.

*See excel file named "[*Name PEFCR_version number*] - Life cycle inventory" for the list of all company-specific data to be collected.*

5.2. List of processes expected to be run by the company

[The processes listed in this chapter shall be additional to the ones listed as mandatory company-specific data. No repetition of processes or data are allowed. In case there are no further processes expected to be run by the company, please state "There are no further processes expected to be run by the company in addition to those listed as mandatory company-specific data."]

There are no further processes expected to be run by the company in addition to those listed as mandatory company-specific data. Users of the PEFCR who do not have access either directly or indirectly (through suppliers) to the mandatory company-specific data listed in Section 5.1 cannot claim compliance with this PEFCR.

5.3. Data quality requirements

The data quality of each dataset and the total PEF study shall be calculated and reported. The calculation of the DQR shall be based on the following formula with four criteria:

$$DQR = \frac{TeR+GeR+TiR+P}{4}$$

Equation 1

Where TeR is technological representativeness, GeR is geographical representativeness, TiR is time representativeness, and P is precision. The representativeness (technological, geographical and time-related) characterises to what degree the processes and products selected are depicting the system analysed, while the precision indicates the way the data are derived and related level of uncertainty.

The next chapters provide tables with the criteria to be used for the semi-quantitative assessment of each criterion.

[The PEFCR may specify more stringent data quality requirements and specify additional criteria for the assessment of data quality. The PEFCR shall report the formulas to be used for assessing the DQR of i) company-specific data (equation 20 of the PEF method), ii) secondary datasets (equation 19 of the PEF method, iii) PEF study (equation 20 of the PEF method).]

5.3.1. Company-specific datasets

The DQR shall be calculated at the level-1 disaggregation, before any aggregation of sub-processes or elementary flows is performed. The DQR of company-specific datasets shall be calculated as following:

1. *Select the most relevant activity data and direct elementary flows: most relevant activity data are the ones linked to sub-processes (i.e. secondary datasets) that account for at least 80% of the total environmental impact of the company-specific dataset, listing them from the most contributing to the least contributing one. Most relevant direct elementary flows are defined as those direct elementary flows contributing cumulatively at least with 80% to the total impact of the direct elementary flows.*
2. *Calculate the DQR criteria TeR, TiR, GeR and P for each most relevant activity data and each most relevant direct elementary flow. The values of each criterion shall be assigned based on*
3. Table 18*.*

    a. *Each most relevant direct elementary flow consists of the amount and elementary flow naming (e.g. 40 g carbon dioxide). For each most relevant elementary flow, the user of the PEFCR shall evaluate the 4 DQR criteria named* $Te_{R\text{-}EF}$, $Ti_{R\text{-}EF}$, $G_{R\text{-}EF}$, P_{EF}*. For example, the user of the PEFCR shall evaluate the timing of the flow measured, for which technology the flow was measured and in which geographical area.*

915 b. *For each most relevant activity data, the 4 DQR criteria shall be evaluated*
916 *(named $Ti_{R\text{-}AD}$, P_{AD}, $G_{r\text{-}AD}$, $T_{er\text{-}AD}$) by the user of the PEFCR.*
917 c. *Considering that the data for the mandatory processes shall be company-*
918 *specific, the score of P cannot be higher than 3, while the score for TiR, TeR,*
919 *and GeR cannot be higher than 2 (The DQR score shall be ≤1.5).*

920 4. *Calculate the environmental contribution of each most relevant activity data (through*
921 *linking to the appropriate sub-process) and direct elementary flow to the total sum of*
922 *the environmental impact of all most-relevant activity data and direct elementary*
923 *flows, in % (weighted, using all EF impact categories). For example, the newly*
924 *developed dataset has only two most relevant activity data, contributing in total to*
925 *80% of the total environmental impact of the dataset:*
926 - *Activity data 1 carries 30% of the total dataset environmental impact. The*
927 *contribution of this process to the total of 80% is 37.5% (the latter is the weight*
928 *to be used).*
929 - *Activity data 2 carries 50% of the total dataset environmental impact. The*
930 *contribution of this process to the total of 80% is 62.5% (the latter is the weight*
931 *to be used).*
932 5. *Calculate the T_eR, T_iR, G_eR and P criteria of the newly developed dataset as the*
933 *weighted average of each criteria of the most relevant activity data and direct*
934 *elementary flows. The weight is the relative contribution (in %) of each most relevant*
935 *activity data and direct elementary flow calculated in step 3.*

936 *The user of the PEFCR shall calculate the total DQR of the newly developed dataset using*
937 Equation 2*, where, $\overline{TıR}, \overline{TeR}, \overline{GeR}, \bar{P}$ are the weighted average calculated as specified*
938 *in point (4).*

939 $$DQR = \frac{\overline{TıR} + \overline{TeR} + \overline{GeR} + \bar{P}}{4}$$

940 Equation 2

Table 18 DQR assessment criteria for datasets with company-specific information*

Rating	PEF and PAD	T_iR-EF and $_{TiR}$-AD	T_eR-EF and T_eR- AD	GeR-EF and GeR-AD
1	Measured/calculated and externally verified	The data refers to the most recent annual administration period with respect to the EF report publication date	The elementary flows and the activity data exactly the technology of the newly developed dataset	The activity data and elementary flows reflects the exact geography where the process modelled in the newly created dataset takes place
2	Measured/calculated and internally verified, plausibility checked by reviewer	The data refers to maximum 2 annual administration periods with respect to the EF report publication date	The elementary flows and the activity data are a proxy of the technology of the newly developed dataset	The activity data and elementary flows) partly reflects the geography where the process modelled in the newly created dataset takes place
3	Measured/calculated /literature and plausibility not checked by reviewer OR Qualified estimate based on calculations plausibility checked by reviewer	The data refers to maximum three annual administration periods with respect to the EF report publication date	Not applicable	Not applicable
4-5	Not applicable	Not applicable	Not applicable	Not applicable

PEF: Precision for elementary flows; PAD: Precision for activity data; TiR-EF: Time Representativeness for elementary flows; TiR-AD: Time representativeness for activity data; TeR-EF: Technology representativeness for elementary flows; TeR-AD: Technology representativeness for activity data; GeR-EF: Geographical representativeness for elementary flows; GeR-AD: Geographical representativeness for activity data.

* Note that the reference years for criterion TiR may be adapted by the TS; more than one table may be included in the PEFCR

5.4. Data needs matrix

All processes required to model the product and outside the list of mandatory company-specific data (listed in Section 5.1) shall be evaluated using the Data Needs Matrix (see Table 19*). The user of the PEFCR shall apply the DNM to evaluate which data are needed and shall be used within the modelling of its PEF, depending on the level of influence the user of the PEFCR (company) has on the specific process. The following three cases are found in the DNM and are explained below:*

1. ***Situation 1****: the process is run by the company applying the PEFCR;*
2. ***Situation 2****: the process is not run by the company applying the PEFCR but the company has access to (company-)specific information;*
3. ***Situation 3****: the process is not run by the company applying the PEFCR and this company does not have access to (company-)specific information.*

Table 19 Data Needs Matrix (DNM)

		Most relevant process	Other process
Situation 1: process run by the company using the PEFCR	Option 1	Provide company-specific data (as requested in the PEFCR) and create a company-specific dataset, in aggregated form (DQR≤1.5)[3] Calculate the DQR values (for each criterion + total)	
	Option 2		Use default secondary dataset in PEFCR, in aggregated form (DQR≤3.0) Use the default DQR values
Situation 2: process not run by the company using the PEFCR but with access to company-specific information	Option 1	Provide company-specific data (as requested in the PEFCR) and create a company-specific dataset, in aggregated form (DQR≤1.5) Calculate the DQR values (for each criterion + total)	
	Option 2	Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR≤3.0)* Re-evaluate the DQR criteria within the product specific context	
	Option 3		Use company-specific activity data for transport (distance), and substitute the sub-processes used for electricity mix and transport with supply-chain specific EF compliant datasets (DQR≤4.0)* Use the default DQR values.
Situation 3: process not run by the company using the PEFCR and without access to company- specific	Option 1	Use default secondary data set in aggregated form (DQR≤3.0) Re-evaluate the DQR criteria within the product specific context	
	Option 2		Use default secondary data set in aggregated form (DQR≤4.0) Use the default DQR values

**Disaggregated datasets shall be used.*

The options described in the DNM are not listed in order of preference.

[3] Company-specific datasets shall be made available to the EC

5.4.1. Processes in situation 1

For each process in situation 1 there are two possible options:

- *The process is in the list of most relevant processes as specified in the PEFCR or is not in the list of most relevant process, but still the company wants to provide company-specific data (option 1);*
- *The process is not in the list of most relevant processes and the company prefers to use a secondary dataset (option 2).*

Situation 1/Option 1

For all processes run by the company and where the user of the PEFCR applies company-specific data. The DQR of the newly developed dataset shall be evaluated as described in Section 5.3.1.

Situation 1/Option 2

For the non-most relevant processes only, if the user of the PEFCR decides to model the process without collecting company-specific data, then the user shall use the secondary dataset listed in the PEFCR together with its default DQR values listed here.

If the default dataset to be used for the process is not listed in the PEFCR, the user of the PEFCR shall take the DQR values from the metadata of the original dataset.

5.4.2. Processes in situation 2

When a process is not run by the user of the PEFCR, but there is access to company-specific data, then there are three possible options:

- *The user of the PEFCR has access to extensive supplier-specific information and wants to create a new EF compliant dataset (Option 1);*
- *The company has some supplier-specific information and want to make some minimum changes (Option 2);*

- *The process is not in the list of most relevant processes and the company wants to make some minimum changes (option 3).*

Situation 2/Option 1

For all processes not run by the company and where the user of the PEFCR applies company-specific data, the DQR of the newly developed dataset shall be evaluated as described in Section 5.3.1.

Situation 2/Option 2

The user of the PEFCR shall use company-specific activity data for transport and shall substitute the sub-processes used for electricity mix and transport with supply-chain specific PEF compliant datasets, starting from the default secondary dataset provided in the PEFCR.

Please note that the PEFCR lists all dataset names together with the UUID of their aggregated dataset. For this situation, the disaggregated version of the dataset is required.

The user of the PEFCR shall make the DQR context-specific by re-evaluating TeR and TiR using

Table 18*. The criteria GeR shall be lowered by 30%*[4] *and the criteria P shall keep the original value.*

Situation 2/Option 3

The user of the PEFCR shall apply company-specific activity data for transport and shall substitute the sub-processes used for electricity mix and transport with supply-chain specific PEF compliant datasets, starting from the default secondary dataset provided in the PEFCR.

Please note that the PEFCR lists all dataset names together with the UUID of their aggregated dataset. For this situation, the disaggregated version of the dataset is required.

[4] *In situation 2, option 2 it is proposed to lower the parameter GeR by 30% in order to incentivise the use of company-specific information and reward the efforts of the company in increasing the geographic representativeness of a secondary dataset through the substitution of the electricity mixes and of the distance and means of transportation.*

In this case, the user of the PEFCR shall use the default DQR values. If the default dataset to be used for the process is not listed in the PEFCR, the user of the PEFCR shall take the DQR values from the original dataset.

Table 20 DQR criteria assessment for secondary datasets

	TiR	*TeR*	*GeR*
1	The EF report publication date happens within the time validity of the dataset	The technology used in the EF study is exactly the same as the one in scope of the dataset	The process modelled in the EF study takes place in the country the dataset is valid for
2	The EF report publication date happens not later than 2 years beyond the time validity of the dataset	The technologies used in the EF study is included in the mix of technologies in scope of the dataset	The process modelled in the EF study takes place in the geographical region (e.g. Europe) the dataset is valid for
3	The EF report publication date happens not later than 4 years beyond the time validity of the dataset	The technologies used in the EF study are only partly included in the scope of the dataset	The process modelled in the EF study takes place in one of the geographical regions the dataset is valid for
4	The EF report publication date happens not later than 6 years beyond the time validity of the dataset	The technologies used in the EF study are similar to those included in the scope of the dataset	The process modelled in the EF study takes place in a country that is not included in the geographical region(s) the dataset is valid for, but sufficient similarities are estimated based on expert judgement.
5	The EF report publication date happens later than 6 years after the time validity of the dataset	The technologies used in the EF study are different from those included in the scope of the dataset	The process modelled in the EF study takes place in a different country than the one the dataset is valid for

[More than one table may be included in the PEFCR and entered in the section on life cycle stages]

5.4.3. Processes in situation 3

If a process is not run by the company using the PEFCR and the company does not have access to company-specific data, there are two possible options:

- *It is in the list of most relevant processes (situation 3, option 1);*
- *It is not in the list of most relevant processes (situation 3, option 2).*

Situation 3/Option 1

In this case, the user of the PEFCR shall make the DQR values of the dataset used context-specific by re-evaluating TeR, TiR and GeR, using the table(s) provided. The criteria P shall keep the original value.

Situation 3/Option 2

For the non-most relevant processes, the user of the PEFCR shall apply the corresponding secondary dataset listed in the PEFCR together with its DQR values.

If the default dataset to be used for the process is not listed in the PEFCR, the user of the PEFCR shall take the DQR values from the original dataset.

5.5. Which datasets to use?

This PEFCR lists the secondary datasets to be applied by the user of the PEFCR. Whenever a dataset needed to calculate the PEF profile is not among those listed in this PEFCR, then the user shall choose between the following options (in hierarchical order):

- *Use an EF compliant dataset available on one of the nodes of the Life Cycle Data Network http://eplca.jrc.ec.europa.eu/LCDN/;*
- *Use an EF compliant dataset available in a free or commercial source;*
- *Use another EF compliant dataset considered to be a good proxy. In such case this information shall be included in the "limitations" section of the PEF report.*
- *Use an ILCD entry level (EL) compliant dataset. These datasets shall be included in the "limitations" section of the PEF report. A maximum of 10% of the total environmental impact may be derived from ILCD-EL compliant datasets (calculated cumulatively from lowest to largest contribution to the total EF profile).*
- *If no EF compliant or ILCD-EL compliant proxy is available, it shall be excluded from the PEF study. This shall be clearly stated in the PEF report as a data gap and validated by the PEF study and PEF report verifiers.*

5.6. How to calculate the average DQR of the study

To calculate the average DQR of the PEF study, the user of the PEFCR shall calculate separately the TeR, TiR, GeR and P for the PEF study as the weighted average of all most relevant

processes, based on their relative environmental contribution to the total single overall score. The calculation rules explained in Section 4.6.5.8 of the PEF method shall be used.

5.7. Allocation rules

[The PEFCR shall define which allocation rules shall be applied by the user of the PEFCR and how the modelling/ calculations shall be made.] The allocations rules that shall be followed are indicated in Table 21. Default data should be used for life cycle stages 3 (distribution and allocation of transport), 4 (use stage, allocation of washing) and 5 (end of life, allocation of end of life treatment), unless primary data are used for LCS3.

1057 Table 21 Allocation rules

Process	Allocation rule	Modelling instructions	Allocation factor
Apparel processing			
Spinning	Mass allocation	When industry data from the entire manufacturing plant (consumption of energy, water, etc...) are collected, an allocation based on physical relationship (mass or area) is needed to obtain the consumption per garment/footwear.	N/A
Sizing	Mass allocation		
Knitting	Mass allocation		
Dyeing	Mass allocation		
Printing	Area allocation		
Finishing	Mass allocation		
Assembly	Mass allocation		
Footwear processing			
Compound forming	Mass allocation	When industry data from the entire manufacturing plant (consumption of energy, water, etc...) are collected, an allocation based on physical relationship (mass or area) is needed to obtain the consumption per garment/footwear.	N/A
Die-cutting	Mass allocation		
In-sole production	Mass allocation		
Sewing	Area allocation		
Stockfitting	Mass allocation		
Assembly	Mass allocation		
Distribution: all transport processes related to the distribution of the final product to the final client	Mass allocation	The distribution impacts (trucks, vans, etc.) are based on the distance travelled and the mass of the product being transported (tonne-kilometre (tkm)).	N/A
Distribution: consumer travel	Volume allocation	The impacts from consumer travel (allocation of the car impact) shall be based on volume.	The allocation factor shall be calculated as the volume of the product divided by the maximum volume ($0.2m^3$ for a passenger car).
Distribution: intermediate storage at warehouse/ distribution centre and retail/ stores	The allocation shall be based on the space (in m^3) and time (in weeks) occupied by the representative product.	The total storage capacity of a warehouse or retail store shall be known, as well as the product-specific volume and the average storage time.	The allocation factor is calculated as the ratio between the product volume*time and storage capacity volume*time. To adjust for additional space the product takes in the storage facility, a storage volume factor of 4 is used for ambient storage, thus the product volume shall be multiplied by 4.

5.8. Electricity modelling

In PEF studies the following electricity mix shall be used, in hierarchical order:

(a) Supplier-specific electricity product (see ISO 14067) shall be used if, for a country, there is a 100% tracking system in place, or if:

(i) available, and

(ii) the set of minimum criteria to ensure the contractual instruments are reliable is met.

(b) The supplier-specific total electricity mix shall be used if:

(i) available, and

(ii) the set of minimum criteria to ensure the contractual instruments are reliable is met.

(c) The 'country-specific residual grid mix, consumption mix' shall be used. Country-specific means the country in which the life cycle stage or activity occurs. This may be an EU or non-EU country. The residual grid mix prevents double counting with the use of supplier-specific electricity mixes in (a) and (b).

(d) As a last option, the average EU residual grid mix, consumption mix (EU+EFTA), or region representative residual grid mix, consumption mix, shall be used.

*The environmental integrity of the use of supplier-specific electricity mix depends on ensuring that contractual instruments (for tracking) are **reliable and unique**. Without this, the PEF lacks the accuracy and consistency needed to drive product/corporate electricity procurement decisions and accurate consideration of the supplier-specific mix by buyers of electricity. Therefore, a set of **minimum criteria** that relate to the integrity of the contractual instruments as reliable conveyers of environmental footprint information has been identified. They represent the minimum features necessary to use supplier-specific mix within PEF studies.*

Note: for the use stage, the consumption grid mix shall be used.

Set of minimum criteria to ensure contractual instruments from suppliers

A supplier-specific electricity product/ mix may only be used if the user of the PEF method ensures that the contractual instrument meets the criteria specified below. If contractual

instruments do not meet the criteria, then country-specific residual electricity consumption-mix shall be used in the modelling.

The list of criteria below is based on the criteria of the GHG Protocol Scope 2 Guidance – An amendment to the GHG Protocol Corporate Standard – Mary Sotos – World Resource Institute. A contractual instrument used for electricity modelling shall:

Criterion 1 – Convey attributes

- *Convey the energy type mix associated with the unit of electricity produced.*
- *The energy type mix shall be calculated based on delivered electricity, incorporating certificates sourced and retired (obtained or acquired or withdrawn) on behalf of its customers. Electricity from facilities for which the attributes have been sold off (via contracts or certificates) shall be characterized as having the environmental attributes of the country residual consumption mix where the facility is located.*

Criterion 2 – Be a unique claim

- *Be the only instruments that carry the environmental attribute claim associated with that quantity of electricity generated.*
- *Be tracked and redeemed, retired, or cancelled by or on behalf of the company (e.g. by an audit of contracts, third party certification, or may be handled automatically through other disclosure registries, systems, or mechanisms).*

Criterion 3 – Be as close as possible to the period to which the contractual instrument is applied

[The TS may provide more information following the PEF method]

<u>Modelling 'country-specific residual grid mix, consumption mix':</u>

Datasets for residual grid mix, consumption mix, per energy type, per country and per voltage are made available by data providers.

If no suitable dataset is available, the following approach should be used:

Determine the country consumption mix (e.g. X% of MWh produced with hydro energy, Y% of MWh produced with coal power plant) and combine them with LCI datasets per energy type and country/region (e.g. LCI dataset for the production of 1MWh hydro energy in Switzerland):

- *Activity data related to non-EU country consumption mix per detailed energy type shall be determined based on:*
- *Domestic production mix per production technologies;*
- *Import quantity and from which neighbouring countries;*
- *Transmission losses;*
- *Distribution losses;*
- *Type of fuel supply (share of resources used, by import and / or domestic supply).*

These data may be found in the publications of the International Energy Agency (IEA (www.iea.org).

- *Available LCI datasets per fuel technologies. The LCI datasets available are generally specific to a country or a region in terms of:*
  - *fuel supply (share of resources used, by import and/ or domestic supply);*
  - *energy carrier properties (e.g. element and energy contents);*
  - *technology standards of power plants regarding efficiency, firing technology, flue-gas desulphurisation, NOx removal and de-dusting.*

Allocation rules:

[The PEFCR shall define which physical relationship shall be used by PEF studies: (i) to subdivide the electricity consumption among multiple products for each process (e.g. mass, number of pieces, volume...) and (ii) to reflect the ratios of production/ratios of sales between EU countries/regions when a product is produced in different locations or sold in different countries. Where such data are not available, the average EU mix (EU-27 + UK +EFTA), or region representative mix, shall be used. The following template shall be used:]

The allocation rules below shall be followed for life cycle stage 2 (manufacturing). If primary data are used for life cycle stage 3 (distribution), the distribution allocation rules shall be used as well.

Table 22 Allocation rules for electricity

Process	Physical relationship	Modelling instructions
Manufacturing	Mass	The electricity mix used shall be a production-weighted average when data from multiple sites are used.
Distribution	Volume	The electricity mix used shall be a volume-weighted average when data from multiple sites are used.

If the consumed electricity comes from more than one electricity mix, each mix source shall be used in terms of its proportion in the total kWh consumed. For example, if a fraction of this total kWh consumed is coming from a specific supplier a supplier-specific electricity mix shall be used for this part. See below for on-site electricity use.

A specific electricity type may be allocated to one specific product in the following conditions:

g) *If the production (and related electricity consumption) of a product occurs in a separate site (building), the energy type physical related to this separated site may be used.*
h) *If the production (and related electricity consumption) of a product occurs in a shared space with specific energy metering or purchase records or electricity bills, the product-specific information (measure, record, bill) may be used.*
i) *If all the products produced in the specific plant are supplied with a publicly available PEF study, the company wanting to make the claim shall make all PEF studies available. The allocation rule applied shall be described in the PEF study, consistently applied in all PEF studies connected to the site and verified. An example is the 100% allocation of a greener electricity mix to a specific product.*

On-site electricity generation:

If on-site electricity production is equal to the site own consumption, two situations apply:

No contractual instruments have been sold to a third party: the own electricity mix (combined with LCI datasets) shall be modelled.

Contractual instruments have been sold to a third party: the 'country-specific residual grid mix, consumption mix' (combined with LCI datasets) shall be used.

If electricity is produced in excess of the amount consumed on-site within the defined system boundary and is sold to, for example, the electricity grid, this system may be seen as a multifunctional situation. The system will provide two functions (e.g. product + electricity) and the following rules shall be followed:

If possible, apply subdivision. Subdivision applies both to separate electricity productions or to a common electricity production where you may allocate based on electricity amounts the upstream and direct emissions to your own consumption and to the share you sell out of your company (e.g. if a company has a windmill on its production site and exports 30% of the produced electricity, emissions related to 70% of produced electricity should be accounted in the PEF study).

If not possible, direct substitution shall be used. The country-specific residual consumption electricity mix shall be used as substitution[5]*.*

Subdivision is considered as not possible when upstream impacts or direct emissions are closely related to the product itself.

5.9. Climate change modelling

The impact category 'climate change' shall be modelled considering three sub-categories:

1. ***Climate change – fossil:*** *This sub-category includes emissions from peat and calcination/carbonation of limestone. The emission flows ending with '(fossil)' (e.g. 'carbon dioxide (fossil)' and 'methane (fossil)') shall be used, if available.*
2. ***Climate change – biogenic****: This sub-category covers carbon emissions to air (CO2, CO and CH4) originating from the oxidation and/or reduction of biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and CO2 uptake from the atmosphere through photosynthesis during biomass growth – i.e. corresponding to the carbon content of products, biofuels or aboveground plant*

[5] *For some countries, this option is a best case rather than a worst case.*

residues, such as litter and dead wood. Carbon exchanges from native forests[6] shall be modelled under sub-category 3 (incl. connected soil emissions, derived products, residues). The emission flows ending with '(biogenic)' shall be used.

A simplified modelling approach shall be used when modelling foreground emissions.

Only the emission 'methane (biogenic)' is modelled, while no further biogenic emissions and uptakes from atmosphere are included. If methane emissions can be both fossil or biogenic, the release of biogenic methane shall be modelled first and then the remaining fossil methane.

3. ***Climate change – land use and land use change**: This sub-category accounts for carbon uptakes and emissions (CO2, CO and CH4) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (including soil carbon emissions). For native forests, all related CO2 emissions are included and modelled under this sub-category (including connected soil emissions, products derived from native forest[7] and residues), while their CO2 uptake is excluded. The emission flows ending with '(land use change)' shall be used.*

For land use change, all carbon emissions and removals shall be modelled following the modelling guidelines of PAS 2050:2011 (BSI, 2011) and the supplementary document PAS2050-1:2012 (BSI, 2012) for horticultural products. PAS 2050:2011 (BSI, 2011): "Large emissions of GHGs can result as a consequence of land use change. Removals as a direct result of land use change (and not as a result of long- term management practices) do not usually occur, although it is recognized that this could happen in specific circumstances. Examples of direct land use change are the conversion of land used for growing crops to industrial use or conversion from forestland to cropland. All forms of land use change that result in emissions or removals are to be included. Indirect land use change refers to such conversions of land use as a consequence of changes in land use elsewhere. While GHG emissions also arise from indirect land use change, the methods and data requirements for calculating these emissions

[6] Native forests – represents native or long-term, non-degraded forests. Definition adapted from table 8 in Annex V C(2010)3751 to Directive 2009/28/EC.

[7] Following the instantaneous oxidation approach in IPCC 2013 (Chapter 2). 210

are not fully developed. Therefore, the assessment of emissions arising from indirect land use change is not included.

The GHG emissions and removals arising from direct land use change shall be assessed for any input to the life cycle of a product originating from that land and shall be included in the assessment of GHG emissions. The emissions arising from the product shall be assessed on the basis of the default land use change values provided in PAS 2050:2011 Annex C, unless better data are available. For countries and land use changes not included in this annex, the emissions arising from the product shall be assessed using the included GHG emissions and removals occurring as a result of direct land use change in accordance with the relevant sections of the IPCC (2006). The assessment of the impact of land use change shall include all direct land use change occurring not more than 20 years, or a single harvest period, prior to undertaking the assessment (whichever is the longer). The total GHG emissions and removals arising from direct land use change over the period shall be included in the quantification of GHG emissions of products arising from this land on the basis of equal allocation to each year of the period[8].

1. *Where it can be demonstrated that the land use change occurred more than 20 years prior to the assessment being carried out, no emissions from land use change should be included in the assessment.*
2. *Where the timing of land use change cannot be demonstrated to be more than 20 years, or a single harvest period, prior to making the assessment (whichever is the longer), it shall be assumed that the land use change occurred on 1 January of either:*

    - *the earliest year in which it can be demonstrated that the land use change had occurred; or*
    - *on 1 January of the year in which the assessment of GHG emissions and removals is being carried out.*

[8] In case of variability of production over the years, a mass allocation should be applied.

The following hierarchy shall apply when determining the GHG emissions and removals arising from land use change occurring not more than 20 years or a single harvest period, prior to making the assessment (whichever is the longest):

1. *where the country of production is known and the previous land use is known, the GHG emissions and removals arising from land use change shall be those resulting from the change in land use from the previous land use to the current land use in that country (additional guidelines on the calculations can be found in PAS 2050- 1:2012);*

2. *where the country of production is known, but the former land use is not known, the GHG emissions arising from land use change shall be the estimate of average emissions from the land use change for that crop in that country (additional guidelines on the calculations can be found in PAS 2050-1:2012);*
3. *where neither the country of production nor the former land use is known, the GHG emissions arising from land use change shall be the weighted average of the average land use change emissions of that commodity in the countries in which it is grown.*

Knowledge of the prior land use can be demonstrated using a number of sources of information, such as satellite imagery and land survey data. Where records are not available, local knowledge of prior land use can be used. Countries in which a crop is grown can be determined from import statistics, and a cut-off threshold of not less than 90% of the weight of imports may be applied. Data sources, location and timing of land use change associated with inputs to products shall be reported." [end of quote from PAS 2050:2011]

Soil carbon storage shall not be modelled, calculated and reported as additional environmental information.

The sum of the three sub-categories shall be reported.

[If climate change is selected as a relevant impact category, the PEFCR shall (i) always request to report the total climate change as the sum of the three sub-indicators, and (ii) for the sub-indicators 'Climate change – fossil', 'Climate change – biogenic' and 'Climate change - land use and land use change', request separate reporting for those contributing more than 5% each to the total score.]

[Choose the right statement]

The sub-category 'Climate change-biogenic' shall be reported separately.

[OR]

The sub-category 'Climate change-biogenic' shall not be reported separately.

Note	Climate change modelling option to be selected after the supporting studies.

The sub-category 'Climate change-land use and land transformation' shall not be reported separately.

5.10. Modelling of end of life and recycled content

The end of life of products used during the manufacturing, distribution, retail, the use stage or after use shall be included in the overall modelling of the life cycle of the product. Overall, this should be modelled and reported at the life cycle stage where the waste occurs. This section provides rules on how to model the end of life of products as well as the recycled content.

The Circular Footprint Formula (CFF) is used to model the end of life of products as well as the recycled content and is a combination of "material + energy + disposal", i.e.:

Material $(1 - R_1)E_V + R_1 \times \left(AE_{recycled} + (1 - A)E_V \times \frac{Q_{Sin}}{Q_p}\right) + (1 - A)R_2 \times \left(E_{recyclingEoL} - E_V^* \times \frac{Q_{Sout}}{Q_P}\right)$

Energy $(1 - B)R_3 \times (E_{ER} - LHV \times X_{ER,heat} \times E_{SE,heat} - LHV \times X_{ER,elec} \times E_{SE,elec})$

Disposal $(1 - R_2 - R_3) \times E_D$

With the following parameters

***A**: allocation factor of burdens and credits between supplier and user of recycled materials.*

***B**: allocation factor of energy recovery processes. It applies both to burdens and credits. It shall be set to zero for all PEF studies.*

Qs_{in}: *quality of the ingoing secondary material, i.e. the quality of the recycled material at the point of substitution.*

Qs_{out}: *quality of the outgoing secondary material, i.e. the quality of the recyclable material at the point of substitution.*

Q_p: *quality of the primary material, i.e. quality of the virgin material.*

R_1: *it is the proportion of material in the input to the production that has been recycled from a previous system.*

R_2: *it is the proportion of the material in the product that will be recycled (or reused) in a subsequent system. R2 shall therefore take into account the inefficiencies in the collection and recycling (or reuse) processes. R2 shall be measured at the output of the recycling plant.*

R_3: *it is the proportion of the material in the product that is used for energy recovery at EoL.*

$E_{recycled}$ **(E_{rec}):** *specific emissions and resources consumed (per functional unit) arising from the recycling process of the recycled (reused) material, including collection, sorting and transportation process.*

$E_{recyclingEoL}$ **(E_{recEoL})**: *specific emissions and resources consumed (per functional unit) arising from the recycling process at EoL, including collection, sorting and transportation process.*

E_v: *specific emissions and resources consumed (per functional unit) arising from the acquisition and pre-processing of virgin material.*

E_{*v}: *specific emissions and resources consumed (per functional unit) arising from the acquisition and pre-processing of virgin material assumed to be substituted by recyclable materials.*

E_{ER}: *specific emissions and resources consumed (per functional unit) arising from the energy recovery process (e.g. incineration with energy recovery, landfill with energy recovery, etc.).*

$E_{SE,heat}$ ***and*** $E_{SE,elec}$: *specific emissions and resources consumed (per functional unit) that would have arisen from the specific substituted energy source, heat and electricity respectively.*

E_D: *specific emissions and resources consumed (per functional unit) arising from disposal of waste material at the EoL of the analysed product, without energy recovery.*

$X_{ER,heat}$ **and** $X_{ER,elec}$: *the efficiency of the energy recovery process for both heat and electricity.*

LHV*: lower heating value of the material in the product that is used for energy recovery.*

[Within the respective chapters, the following parameters shall be provided in the PEFCR:

- All A values to be used shall be listed in the PEFCR, together with a reference to the PEF method and Annex C. In case specific A values cannot be determined by the PEFCR, the PEFCR shall prescribe the following procedure for its users:
  - Check in Annex C the availability of an application-specific A value which fits the PEFCR,
  - If an application-specific A value is not available, the material-specific A value in Annex C shall be used,
  - If a material-specific A value is not available, the A value shall be set equal to 0.5.
- All quality ratios (Qsin, Qsout/Qp) to be used.
- Default R1 values for all default material datasets (in case no company-specific values are available), together with a reference to the PEF method and Annex C. They shall be set to 0% when no application-specific data are available.
- Default R2 values to be used in case no company-specific values are available, together with a reference to the PEF method and Annex C. https://eplca.jrc.ec.europa.eu/permalink/Annex_C_V2.1_May2020.xlsx
- All datasets to be used for Erec, ErecEoL, Ev, E*v, EER, ESE,heat and ESE,elec, ED]

[Default values for all parameters shall be listed in a table in the section of the appropriate life cycle stage.]

The CFF relies on several parameters which account for: physical characteristics of products sent to recycling (e.g. the material quality after recycling and the heating value of the material); impacts of processes (impact of energy production, recycling and substituted virgin material production); and the market reality for a recycled product.

For apparel and footwear products, the **A** factor is set at 0.8 by the PEF method in Annex C. To model recycled materials coming from another value chain (e.g. when for the production of a T-shirt (synthetic), recycled fibres from PET bottles are used as an input to the textile fibre production) or leaving the system for another value chain (e.g. textile composted for use in agriculture), the **A** factor should also be selected according to Annex C of the PEF method (e.g. A is 0.5 for plastics and PET bottles, 0.5 for compost).

The **B** factor is currently defined as 0 by the PEF method, i.e. 100% of generated, externally used energy is credited to the provider of incinerated material and included as an impact for the user of the recovered energy (i.e. both waste-to-energy burdens and avoided primary production benefits).

The parameters of the CFF are to be defined for each raw material / disposed material and reported and justified in the product footprint report.

In the case of recycling, the $\mathbf{R_2}$, $\mathbf{E_{rec}}$, $\mathbf{E_{recEoL}}$, $\mathbf{E_v}$ and $\mathbf{E^*_v}$ shall be defined for every recycling process.

- The $\mathbf{R_1}$ factor shall be defined as the share of recycled material in each raw material.
- The rate of recycling, $\mathbf{R_2}$, defined for each recycling scenario applicable shall account for the quantity of recycled material effectively produced by the recycling process (accounting for processing loss rates).
- The rate of material sent to energy recuperation, $\mathbf{R_3}$, shall correspond to the rate of product sent to incineration with energy recovery[9] (including the share of product sent to incineration as municipal waste and the share of product collected as used clothing and footwear articles, sorted as non-recyclable and sent to incineration).
- The share of product landfilled or disposed of without energy recovery, equal to 1 – $\mathbf{R_2}$ – $\mathbf{R_3}$, equates to considering by default that the losses of the recycling process[10] are landfilled or disposed of, without energy recovery. If the recycling losses are known to be disposed of otherwise, the end-of-life may be modelled accordingly.

[9] The CFF includes the recuperation of energy from landfills in the R_3 term. Since the recuperation of methane emitted from apparel or footwear products in landfill is not known, it is not included in the PEFCR.

[10] This refers to the material losses occurring in the transformation of the recyclable product into recycled material.

- The quality factor ratios for each substitution, $\frac{\mathbf{Q_{s_{in}}}}{\mathbf{Q_p}}$ and $\frac{\mathbf{Q_{s_{out}}}}{\mathbf{Q_p}}$, should account for the difference in quality in comparison to the virgin material. In particular, in the case of mechanical recycling, the fibres have a lesser quality than the virgin fibres they would substitute. The nature and unit of the parameter chosen to measure material quality is not defined by the PEF method. Substitution rates or economic values are used for this parameter.
- $\mathbf{E_{rec}}$ and $\mathbf{E_{recEoL}}$ shall be defined as the impacts of the collection, sorting, pre-processing, processing and transportation of materials involved in treating materials sent to recycling until their use as recycled materials.
- $\mathbf{E_v}$ and $\mathbf{E^*_v}$ correspond to the impacts of substituted or consumed virgin materials, with the same scope as the factors for recycled materials.
- $\mathbf{X_{ER,heat}}$ and $\mathbf{X_{ER,elec}}$, $\mathbf{E_{SE,heat}}$, $\mathbf{E_{SE,elec}}$ and $\mathbf{E_D}$ shall be defined according to the practices and electricity mixes in the applicable geographical zone where the product is disposed of.

The following part of the Circular Footprint Formula is used to model the recycled content:

$$(1 - R_1)E_v + R_1(AE_{recycled} + (1 - A)E_v \frac{Q_{sin}}{Q_p})$$

The R1 values applied shall be supply-chain specific or R1=0 should be used as default*, in relation with the DNM. Material-specific values based on supply market statistics are not accepted as a proxy and therefore shall not be used. The applied R1 values shall be subject to PEF study verification.*

When using supply-chain specific R1 values other than 0, traceability throughout the supply chain is necessary. The following guidelines shall be followed when using supply-chain specific R1 values:

- *The supplier information (through e.g. statement of conformity or delivery note) shall be maintained during all stages of production and delivery at the converter;*
- *Once the material is delivered to the converter for production of the end products, the converter shall handle information through their regular administrative procedures;*

- *The converter for production of the end products claiming recycled content shall demonstrate through its management system the [%] of recycled input material into the respective end product(s).*
- *The latter demonstration shall be transferred upon request to the user of the end product. In case a PEF profile is calculated and reported, this shall be stated as additional technical information of the PEF profile.*
- *Company-owned traceability systems may be applied as long as they cover the general guidelines outlined above.*

According to the PEF method (chapter 4.4.8.6.), the default value for R_1 is 0%. This is also in line with a study on the European market on the potential for recycled fashion from the Confederation of British Industry (2020), which shows that the use of recycled apparel and footwear products is still negligible.

Table 23 Definition of the CFF parameters for the raw materials

Fibre type	Scope for E_v	Flow of recycled material	Origin of recycled material	A	R_1	Q_{Sin}/Q_p	E_{rec}
Synthetic	Production of virgin polyester fibres	Recycled polyester fibres	PET recyclate	0.5	0%	1	Impacts of sorting and recycling PET recyclate into polyester fibres
			PET bottles			0.7[11]	Impacts of sorting and recycling PET bottles into polyester fibres
Recycled materials from textiles	Production of cellulosic virgin fibres	Recycled fibres	Textile product	0.8	0%	0.5[12]	Impacts of collection, sorting, shredding of used textiles
	Production of synthetic virgin fibres	Recycled fibres	Textile product	0.8	0%	0.75[13]	Impacts of collection, sorting, shredding of used textiles
Footwear	Production of virgin rubber	Recycled rubber	Footwear	0.5[14]	0%	to be defined	Impacts of collection, sorting, recycling of used footwear

According to the PEF Method, the Q_{Sout}/Q_p and Q_{Sin}/Q_p ratios are capped at 1. The ratios are relevant if the substituted primary material and the recycled material are similar materials. In

[11] (Arena et al. 2003) in (Shen et al. 2011)

[12] Expert opinion extrapolated from case studies

[13] Expert opinion

[14] In accordance with Annex C

cases where the recycled material substitutes a different material, the quality ratio is set as 1 and the difference in the quantity of material used shall be accounted in the E^*_v parameter. The E^*_v parameter shall be scoped for the quantity of virgin material needed to fulfil the same function as the quantity of recycled material (see also Table 23).

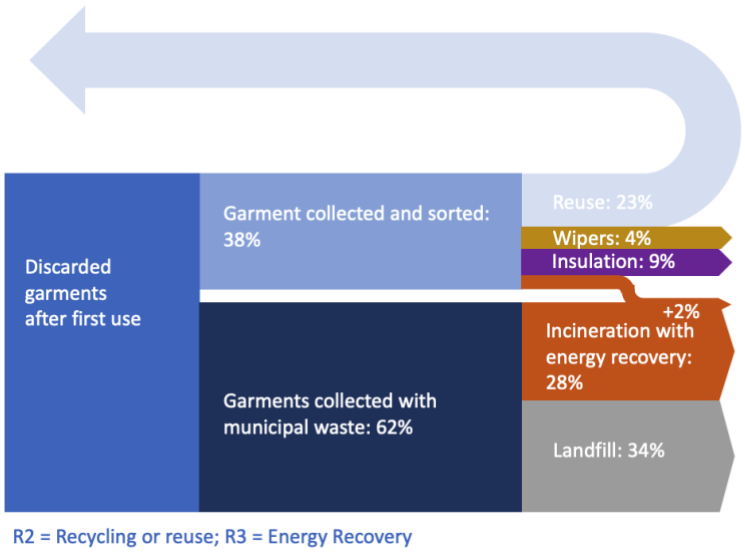
The default parameters for raw materials in the CFF are defined in Table 23.

Table 24 Guidelines for defining the quality ratio in the CFF

Situation	Typical cases	CFF application
Quality loss compensated by **increased material quantity**	Cardboard, textile production (increased spinning losses because of shorter fibres)	Q_{sout}/Q_p based on mass ratio, considering the quality is the inverse of the mass needed.[15]
Quality loss **limits** the maximum incorporation	Recycled yarn used in clothing, footwear materials and components (e.g. insocks, insoles, outsoles and composites)	Q_{sout}/Q_p = 1 as long as the quantity of recycled material is below the maximum incorporation threshold. If the incorporation of recycled material induces more losses, refer to previous case.
Quality loss forces application with **lower quality requirement /** transfer to **another application field**	Footwear and other plastic products recycled into a plastic public bench (instead of a wooden bench)	Q_{sout}/Q_p is set as 1 Functional Unit of E^*_v : amount of wood substituted by 1 kg of PET
	Textile and footwear materials and components recycled into insulation materials	Q_{sout}/Q_p is set as 1 Substitute conventional insulation material Functional unit of E*v : amount of material for identical thermal insulation
	PET bottle recycled to synthetic fibre into a fleece jacket (instead of wool or polyester)	Consider substitution to closest material, e.g. polyester Q_{sout}/Q_p is set as 1
	Compost and methanisation	Apply A = 0.5 for compost (and composted digestate) E^*_v x Q_{sout}/Q_p is set as 0 due to lack of primary data and for the sake of simplicity
Recycled materials **unlikely to replace virgin material**	Textile garments recycling into wipers	Q_{sout}/Q_p is defined as a quotient of the economic values of the recycled material over the virgin material, it is considered that the price difference accounts for the difference in usage practices

Figure 3 details the general post-consumer scenario rates. These scenarios and the corresponding R_2 and R_3 values presented in Figure 3 and Table 25 are from the Synthesis of the Environmental Assessment of the Value Chain of Used Textiles (RDC Environment and EcoTLC, 2019), with the added assumption that materials recycled as insulation replace mineral wool. R2 values do not apply for pathways with a recyclability disruptor (Table 26).

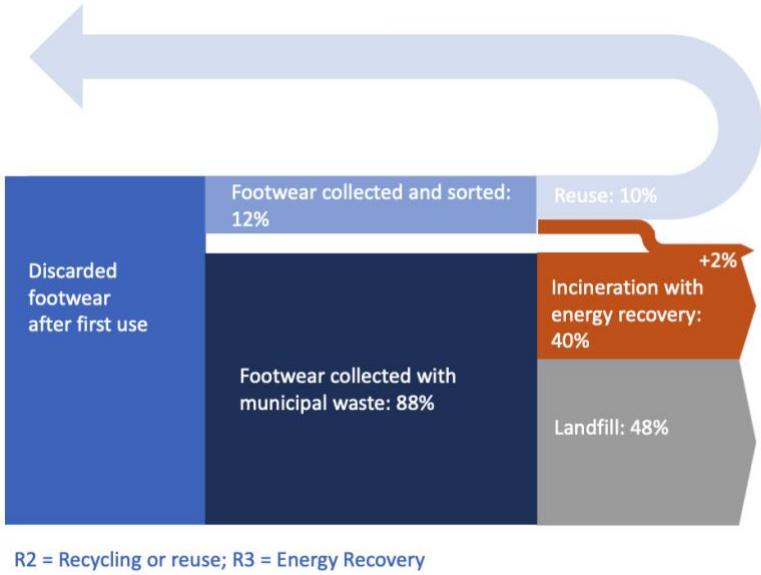
[15] For example, 100 g of primary material is substituted by 150 g of secondary material → Q_{sout}/Q_p =100/150 = 0.667



Status in CFF Formula	Rate of End-Of-Life scenario (excluding reuse)
R2_Wipers	5%
R2_Insulation	12%
R3	39%
1 – R2 – R3	44%

Figure 3 Scenarios for post-consumer apparel and definition of R_2 and R_3 parameters for the CFF

For footwear, as detailed in Figure 4, it is difficult to find statistics on recycling[16], which is thus assumed to be negligible. A 12% collection rate and a 10% reuse rate[17] are used, the European rate of landfill / incineration (Annex C, PEF method) with energy recovery is applied to the 88% of footwear disposed with municipal waste.



Status in CFF Formula	Rate of End-Of-Life scenario (excluding reuse)
R2	0%
R3	46%
1 – R2 – R3	54%

Figure 4 Scenarios for post-consumer footwear and definition of R_2 and R_3 parameters for the CFF

The percentages shown in Figure 3 and Figure 4 are scaled to 100% excluding the reuse share. The general parameters for end-of-life in the CFF are defined in Table 25, references for these parameters are listed in the paragraphs above.

[16] Better Shoe Foundation, http://www.bettershoes.org/home/post-consumer-life, last accessed 2021/01/12

[17] EcoTLC (Refashion), 2019, Roads to innovation, https://refashion.fr/pro/sites/default/files/fichiers/Chemins-Innovation2019_EN_BD.pdf) (accessed 2021/17/02)

1435 Table 25 Definition of the CFF parameters for the end-of-life for apparel

Recycling pathway	Scope for E^*_v	A	R_2 for pathway	Q_{Sout}/Q_p	E_{rec}	R_3
Mechanical recycling						
Wipers	Production of wipers from virgin cotton	0.8	5%	0.3[18],	Collection, sorting of clothes and production of wipers from used clothes	
Insulation	Production of virgin mineral wool	0.8	12%	1[19]	Collection, sorting of clothes and production of insulation from used clothes	
Apparel	Virgin fibres (which are replaced)	0.8	0%	0.5[20]	Collection, sorting of clothes, and production of recycled fibres through mechanical recycling	*39%*
			Total:	***17%***		
Chemical recycling						
Apparel and other applications	Virgin synthetic fibres	0.8	0%	1[21]	Collection, sorting of clothes, production of recycled fibres through chemical recycling	
	Virgin manmade cellulosics	0.8	0%	0.5[22]		
			Total:	***0%***		

1436

1437 Recyclability disruptors and corresponding R_2 values for specific pathways are shown in Table

1438 26.

1439 Table 26 Recyclability disruptors and corresponding R_2 values for specific pathways

Product type	Main disruptors	R_2
Apparel	Products laminated with different materials	0 for all pathways
	Less than 80% cotton	0 for wiper pathway
	Products with more than 5% elastane	0 for insulation pathway
	Products with metallic fibres	
	Products with electrical and electronic equipment	0 for all pathways
	Materials without viable recycling technology	0 for all pathways
Footwear	Products with electrical and electronic equipment	0 for all pathways
	Products with fixed composites (glued)	0 for all pathways

[18] Based on prices from MSC Industrial Direct, this ratio goes from 0.2 for jean-based rags, to 0.5 for good state white t-shirt-based rags, with mixed reclaimed wipers having a ratio of 0.3. Considering most garments are reused in the European context, the value recommended is 0.3.

[19] Mineral wool has a lower insulation quality. As per the PEF Method 2019 (p. 69), the quality ratio is set to 1

[20] Expert opinion extrapolated from case studies. This includes the loss of short fibres in the process.

[21] Chemically recycled synthetic fibres are assumed to have the same characteristics as virgin fibres.

[22] Expert opinion extrapolated from case studies. This includes the loss of short fibres in the process.

[Industry systems may be applied as long as they cover the general guidelines outlined above. In that case, the text above may be replaced by those industry specific rules. If not, they shall be supplemented with the general guidelines above.]

In case a recycling scenario is not covered in this PEFCR (either in Table 26 or in Section 5.10 above), the PEF method (Section 4.4.8.9) provides additional information on the recycling output rate (R_2 value).

"The product design and composition will determine if the material in the specific product is actually suitable for recycling. Therefore, before selecting the appropriate R_2 value, an evaluation of the recyclability of the material shall be made and the PEF study shall include a statement on the recyclability of the materials/ products:
The statement on recyclability shall be provided together with an evaluation for recyclability that includes evidence for the following three criteria (as described by ISO 14021:2016, Section 7.7.4 'Evaluation methodology'):

1. *The collection, sorting and delivery systems to transfer the materials from the source to the recycling facility are conveniently available to a reasonable proportion of the purchasers, potential purchasers and users of the product;*
2. *The recycling facilities are available to accommodate the collected materials;*
3. *Evidence is available that the product for which recyclability is claimed is being collected and recycled. For PET bottles the EPBP guidelines should be used (https://www.epbp.org/design-guidelines), while for generic plastics the recyclability by design should be used (www.recoup.org).*

If one criterion is not fulfilled, or the sector-specific recyclability guidelines indicate limited recyclability, an R_2 value of 0% shall be applied. Point 1 and 3 may be proven by recycling statistics (country specific) derived from industry associations or national bodies. Approximation to evidence at point 3 may be provided by applying for example the design for recyclability evaluation outlined in EN 13430 Material recycling (Annexes A and B) or other sector-specific recyclability guidelines if available.
Default application-specific R_2 values are available in Annex C. The following procedure shall be followed to select the R_2 value to be used in a PEF study:

- *Company-specific values shall be used when available and following the evaluation of recyclability.*
- *If no company-specific values are available and the criteria for the evaluation of recyclability are fulfilled (see above), application-specific R_2 values shall be used selecting the appropriate value available in Annex C:*
    - *If an R_2 value is not available for a specific country, then the European average shall be used;*
    - *If an R_2 value is not available for a specific application, the R_2 values of the material shall be used (e.g. materials' average);*
    - *In case no R_2 values are available, R_2 shall be set equal to 0 or new statistics may be generated in order to assign an R_2 value in the specific situation.*

The applied R_2 values shall be subject to the PEF study verification.

Background information to calculate the R_2 values for packaging materials is available in Annex C."

For both garments and footwear, the user may use case-specific data to model end-of-life scenarios such as composting, mechanical or chemical recycling.

6. Life cycle stages

Note	All the appendices mentioned in Section 6 will be provided after the supporting studies.

6.1. Raw materials acquisition and pre-processing

[The PEFCR shall list all technical requirements and assumptions to be applied by the user of the PEFCR. Furthermore, it shall list all processes taking place in this life cycle stage (according to the model of the RP), following the table provided below (transport in separate table). The table may be adapted by the TS as appropriate (e.g. by including relevant parameters of the Circular Footprint Formula).]

Note	Raw material acquisition and pre-processing processes will be provided as an Excel file in an appendix after the supporting studies. See Table 17 as an example.

The user of the PEFCR shall report the DQR values (for each criterion + total) for all the datasets used.

The raw materials acquisition and pre-processing life cycle stage includes the processes starting with the extraction of the resources through the gate of the product's production facility (processing and manufacturing plant). The raw materials acquisition and the pre-processing stage are considered to be most relevant life cycle stages for all product sub-categories and thus shall be included for all PEF studies (PEF method).

This life cycle stage usually includes the extraction and processing of fibres. The following production, pre-processing and transport processes are included in the raw materials datasets provided in the EF 3.0 compliant database:

- Mining, extraction, and refining of resources (e.g. including raw oil);
- Pre-processing of all material inputs to the studied product, including recycled materials;
- Agricultural and forestry activities;

- Transportation within and between extraction and pre-processing facilities, and to the production facility (manufacturing plant); and
- Packaging production.

6.1.1. Raw materials production

For both apparel and footwear products, the following processes shall be considered:

- Production of raw textile materials (plant-based and synthetic);
- Production of fibrous and non-fibrous animal-based materials;
- Trim production;
- Packaging materials production and processing; and
- Transportation between the extraction and pre-processing facilities and to the production facility (manufacturing plant).

For background EF-compliant datasets, it will be clearly indicated if LUC emissions are included or not. For non-compliant datasets from another database or that were created for the specific PEF, LUC must be modelled as described in the PEF method

6.1.2. Raw material circularity

Circularity of raw materials is addressed in the following two cases:

- The apparel or footwear product uses recycled materials, which can be of textile or non-textile origin; or
- The apparel or footwear product is recycled after use; this includes recycling apparel and footwear into raw materials for chemicals or other materials such as rubber, plastic, composites, etc.

In these two cases, the credits and impacts associated to these flows are modelled and allocated to the raw material using the Circular Footprint Formula (CFF), presented in detail in Section 5.10. Additional details regarding the CFF are described in Section 4.4.8.1 of the PEF method.

6.1.3. Packaging production

Different types of packaging need to be produced to ensure safe shipping and storage of apparel and footwear products. The differentiation between primary, secondary and tertiary packaging is defined as follows:

- **Primary packaging**: Material that immediately covers the product. For example, primary packaging can consist of a plastic film or bag, or paper wrapping. The hangtag is also considered to be primary packaging.
- **Secondary packaging**: Packaging or containment of a primary package. Packaging for multiple products and their labels are also considered to be secondary packaging.
- **Tertiary packaging**: Packaging conceived to facilitate handling and transport of a number of sales units, or grouped packaging to prevent physical handling and transport damage.

The default packaging materials per different business scenarios below shall be used for all apparel and footwear sub-categories, unless primary data are used (expert judgement and (Sandin, 2019)). The transport steps are detailed in Table 33.

Table 27 Default packaging materials per piece of garment, for retail / in-store business scenario

Sub-category	Packaging type	Raw material	Amount	Unit
Apparel	Primary	Polybag	0.02	kg
		Polybag	0.02	kg
	Secondary	Corrugated cardboard	0.06	kg
	Tertiary	Pallets	0.03	kg
		Shrink film	0.001	kg
Footwear	Primary	Polybag	0.02	kg
		Corrugated cardboard	0.2	kg
	Secondary	Corrugated cardboard	0.06	kg
	Tertiary	Pallets	0.03	kg
		Shrink film	0.001	kg

1554 Table 28 Default packaging materials per piece of garment, for e-commerce business scenario

Sub-category	Packaging type	Raw material	Amount	Unit
Apparel	Primary	Corrugated cardboard	0.06	kg
		Polybag	0.02	kg
	Secondary	Corrugated cardboard	0.06	kg
	Tertiary	Pallets	0.03	kg
		Shrink film	0.001	kg
Footwear	Primary	Corrugated cardboard	0.2	kg
	Secondary	Corrugated cardboard	0.06	kg
	Tertiary	Pallets	0.03	kg
		Shrink film	0.001	kg

1555

1556 Table 29 Default packaging materials per piece of garment, for D2C business scenario

Sub-category	Packaging type	Raw material	Amount	Unit
Apparel	Primary	Polybag	0.02	kg
	Secondary	Corrugated cardboard	0.06	kg
	Tertiary	Pallets	0.03	kg
		Shrink film	0.001	kg
Footwear	Primary	Corrugated cardboard	0.2	kg
	Secondary	Corrugated cardboard	0.06	kg
	Tertiary	Pallets	0.03	kg
		Shrink film	0.001	kg

1557

1558 If packaging contains several apparel or footwear products (e.g. one corrugated cardboard
1559 box contains 30 t-shirts), the total packaging weight shall be divided by the number of
1560 products enclosed.

1561 The distribution scenarios in Section 6.3 shall be used for packaging materials.

1562 Packaging recycling is accounted for in Section 6.1.4 below.

6.1.4. Packaging circularity

If the packaging contains recycled materials or if it is sent to recycling or energy recovery at its end of life, the burdens and credits shall be allocated using the CFF, presented in Section 5.10.

In the case of reusable packaging, the expected number of reuses of the packaging shall be used to allocate packaging production and end of life to the apparel or footwear product life cycle. Guidance on evaluating the number of reuses of the packaging is given in the PEF method in section 4.4.9.3.

6.1.5. Raw materials and packaging distribution

[For the different ingredients transported from supplier to factory, the user of the PEFCR needs data on (i) transport mode, (ii) distance per transport mode, (iii) utilisation ratios for truck transport and (iv) empty return modelling for truck transport. The PEFCR shall provide default data for these or request these data in the list of mandatory company-specific information. The default values provided in the PEF method shall be applied unless PEFCR-specific data are available.]

Note	Raw materials and packaging distribution processes will be provided as an Excel file in an appendix after the supporting studies. See Table 17 as an example.

The distribution of raw materials used for apparel and footwear products from a supplier to the manufacturing plant are also included in the raw materials life cycle stage. It also includes the transportation of semi-finished and intermediate products between manufacturing stages.

Transport of raw materials is part of mandatory company-specific data (see Section 5.1.1). In case the raw material is bought as a global commodity, the transport shall be modelled as if the supplier is located outside the continent of the processing plant (ship):

1587 Table 30 Default transport scenarios and parameters for product transport

Supply chain location	Distance (km)	Utilisation ratio	Transportation mode
Supplier located outside the continent of the processing plant (ship)	1'000	64%	Truck (>32 t, EURO 4)
	18'000	n/a	Ship (transoceanic container)

1588

1589 The impact of the transport shall be calculated per tonne kilometre (tkm), which is equivalent
1590 to the transport of 1 tonne (t) of product over 1 kilometre (km). The distance and
1591 transportation mode for each material coming to the manufacturing plant shall be based on
1592 specific data as indicated in section 5.1.1, and weight-limited transport shall be taken into
1593 account for all materials transported. In the case of a data gap, the default values given in
1594 Table 31 shall be used (adapted from the PEF method 2019; Eurostat, 2015a). Note that in
1595 the case of multi-sourcing for the same item, the allocation of resources and emissions
1596 should be done by mass allocation.

1597 Table 31 Default transport scenarios and parameters for product transport

Supply chain location	Utilisation ratio	Transportation mode
Supplier located in the same continent as the processing plant	64%	Truck (>32 t, EURO 4)
	n/a	Train (average freight train)
	n/a	Ship (barge)
Supplier located outside the continent of the processing plant (ship)	64%	Truck (>32 t, EURO 4)
	n/a	Ship (transoceanic container)
Supplier located outside the continent of the processing plant (plane)	64%	Truck (>32 t, EURO 4)
	n/a	Air freight (cargo plane)

1598 [Packaging shall be modelled as part of the raw material acquisition stage of the life cycle.]

1599 The distance and transportation mode for each packaging material coming to the
1600 manufacturing plant shall be included.
1601 It is assumed that all packaging comes from the same continent as the manufacturing plant.
1602 The transport types listed for each unique supply chain type are additive.

Packaging transport is assumed to be weight-limited for all packaging types. The default parameters (from the PEF method) for packaging transport in Table 32 below shall be used for all apparel and footwear sub-categories, unless primary data are used.

Table 32 Default transport parameters for raw materials packaging materials

Supply chain	Distance (km)	Utilisation ratio	Provenance (% of total transport)	Transportation mode
Supplier located within the continent of the manufacturing plant	230	64%	100%	Truck (>32 t, EURO 4)
	280	n/a		Train (average freight train)
	360	n/a		Ship (barge)

6.1.6. Raw materials and deadstock

The deadstock definition used in this PEFCR is the French deadstock definition (Décret n°2020-1724): *products that could not be sold in traditional sales channels, or through discount sales or private sales*.

Items that could not be sold are defined as items that have either been written off from the company's inventory, or have remained in stock in a warehouse for more than 3 years.

Deadstock shall be accounted for in the following life cycle stages:

- LCS 1 – raw materials acquisition and processing
- LCS 2 – manufacturing
- LCS3 – distribution

The average deadstock rate of the last three administration periods for the product category shall be used.

In the raw materials acquisition and pre-processing stage, deadstock shall be used as a direct multiplier of the input of raw materials. For example, a 20% deadstock rate will mean that the Bill of Materials will be multiplied by 1.2 per product.

6.2. Manufacturing

[The PEFCR shall list all technical requirements and assumptions to applied by the user of the PEFCR. Furthermore, it shall list all processes taking place in this life cycle stage, according to the table provided below. The table may be adapted by the TS as appropriate (e.g. by including relevant parameters of the Circular Footprint Formula).]

[Default loss rates per type of product and how these shall be included in the reference flow shall be described.]

Primary data shall be used to model the energy inputs during the manufacturing stage. The electricity mix (i.e. national consumption) used shall be a production-weighted average when data from multiple sites are used.

Details on how to address multi-functionality of the manufacturing processes are provided in Section 5.7.

The production waste shall be included in all modelling steps up to the output of the manufacturing stage. Manufacturing wastes shall be modelled according to the CFF formula (PEF method chapter 4.4.2).

Note	Manufacturing processes will be provided as an Excel file in an appendix after the supporting studies. See Table 17 as an example.

The user of the PEFCR shall report the DQR values (for each criterion + total) for all the datasets used.

6.2.1. Manufacturing processes

The manufacturing life cycle stage includes the impacts from production of the final apparel and footwear products. Considerations for the manufacturing life cycle stage are different between apparel and footwear products and thus include different manufacturing processes, which are described separately below. In both cases, the supply chains have been broken into

a system of “tiers” based on closeness to the apparel and footwear manufacturer (tier 1 being directly in contact with the manufacturer).

Apparel manufacturing (including apparel accessories) includes the following processes per tier:

- Processing of raw materials, both from virgin and recycled content. This includes various processes such as spinning fibres into yarn as well as processing non-fibrous products (for example leather) into other intermediate products (tier 3).
- Material production, such as knitting and weaving textiles, preparation, dyeing and finishing of fabric (tier 2).
- Component consolidation and final assembly of the product. This includes various processes such as cutting, assembly (cutting/sewing), garment wet processing/washing, dry treatment processes (e.g. laser), and the packaging for sale (tier 1).

Footwear manufacturing includes the following processes:

- Component manufacturing including manufacturing of the individual parts of the shoe (bottom, mid and upper parts) as well as compound forming (sole production), in-sole production, die-cutting and sewing.
- Component consolidation and final assembly of the product. Processes included are: stockfitting, assembly and the packaging for sale.

Footwear manufacturing can be very complex and variable, with different manufacturing pathways found for the same type of shoe and brand. The processes above have been selected due to their applicability for most types of footwear products and manufacturing pathways, covering the most environmentally intensive processes.

6.2.2. Manufacturing losses and deadstock

Apparel losses

For textile materials, the input and output amounts shall be calculated based on the bill of materials or, if not available, on the weight of the final product’s textile content and residual

losses (wastes) along the production and value chain. The weight of the textile is given as the weight of the final products minus the weight of all non-removable accessories such as buttons, zippers and care labels.

The following hypothesis shall be considered:

- The amount of input material for process n is equal to the amount of output material for process n-1 (T-shirt PEFCR, 2019).

Therefore, the textile weight of the final product and the textile losses for manufacturing process can be used to calculate the amount of input raw materials.

Equation 3 shall be used to determine the amount of input material:

$$Amount\ of\ input\ material_n = \frac{Amount\ of\ output\ material_n}{1 - Textile\ waste_n}$$

Equation 3

Where the input and output are measured in kg and the textile waste is measured as a percentage.

For example, the average final product weight of RP1 is given as 168.3 g (textile weight only). Assuming that assembly produces 20% textile waste for apparel products, the input material for assembly can be calculated using Equation 3 above to be 210.4 g (=168.3 / (1-20%)) for apparel.

<u>Footwear losses</u>

- Losses during footwear manufacturing can occur along the whole manufacturing pathway. Depending on the type of shoe and processes applied, the losses between each step can vary significantly.

<u>Manufacturing deadstock</u>

In this life cycle stage, deadstock as defined in Section 6.1.6 is reflected as input to the manufacturing processes: the additional input of raw materials included in LCS1 shall be taken into account in LCS2.

6.3. Distribution stage

The transport of the final product from factory to final client (including consumer transport) shall be modelled within this life cycle stage. The final client is defined as the individual purchaser of the apparel or footwear product.

In case supply-chain-specific information is available for one or several transport parameters, they may be applied following the Data Needs Matrix.

[A default transport scenario shall be provided by the TS in the PEFCR. In case no PEFCR-specific transport scenario is available, the transport scenario provided in the PEF method shall be used as a basis together with (i) a number of PEFCR-specific ratios, (ii) PEFCR-specific utilisation ratios for truck transport, and (iii) PEFCR-specific allocation factor for consumer transport. For reusable products, the return transport from retail/DC to factory shall be added in the transport scenario. The PEFCR shall list all processes taking place in scenario (according to the model of the RP) using the table below. The table may be adapted by the TS as appropriate]

Note	Distribution processes will be provided as an Excel file in an appendix after the supporting studies. See Table 17 as an example.

The user of the PEFCR shall report the DQR values (for each criterion + total) for all the datasets used.

The waste of products during distribution and retail shall be included in the modelling. [Default loss rates per type of product and how these shall be included in the reference flow shall be described. The PEFCR shall follow the PEF method Annex F in case no PEFCR-specific information is available.]

6.3.1. Distribution models and transport processes

The distribution life cycle stage includes the impacts related to the transport of final apparel and footwear products to the final client, including the impacts related to intermediate storage and distribution losses. The final client is defined as a private individual.

Considerations for the distribution stage are similar for all products categories because the transport modes and distances are not necessarily product-specific.

Two main distribution models are illustrated in Figure 5:

- E-commerce scenario, including Direct to Consumer (D2C) sales
- Retail/in-store scenario

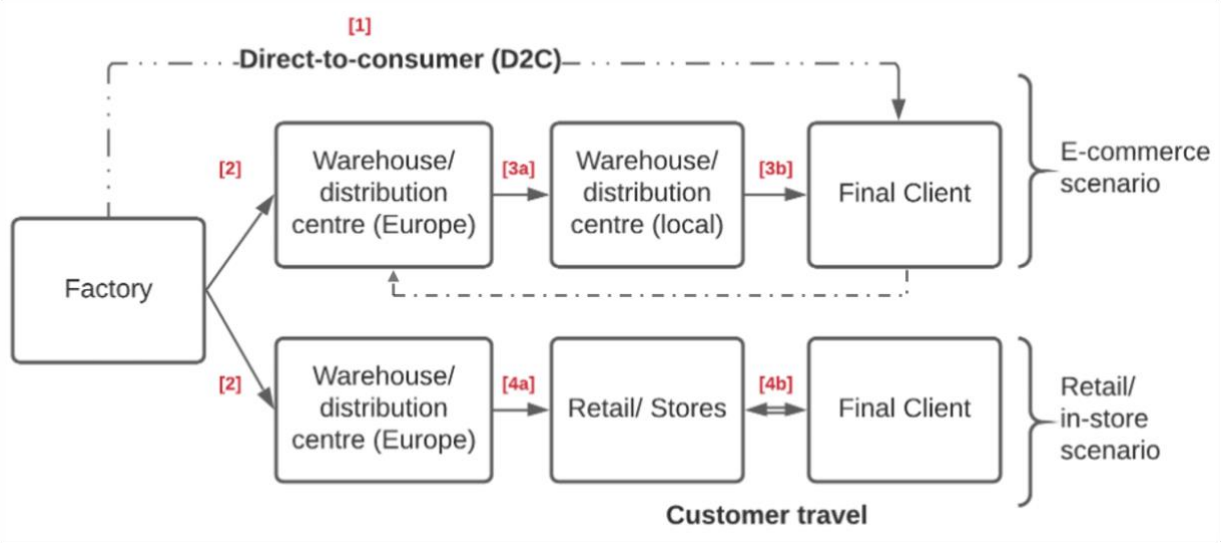


Figure 5 Transport processes and scenarios

The numbers in brackets refer to the transport processes described in Table 33 further below (expert judgement, PEF method).

The e-commerce scenario includes the transport of the final product from outside or inside Europe (factory) to a warehouse or distribution centre (located in Europe and/or local), the storage at the warehouse or distribution centre, and further transportation from the warehouse or distribution centre to the final client. As a growing part of online sales which involves a high share of international supply chains for products sold in Europe, D2C sales are considered in the e-commerce scenario as well. The impacts generated by the digital infrastructure used for online shopping shall be taken into account. For each product ordered, 30 Wh of electricity (European grid mix) are needed based on expert judgement.

In the retail/ in-store sales scenario, the product is first transported from the factory to a warehouse or distribution centre (located in Europe), then from the warehouse or

distribution centre to a retail/ store, and finally transported to the final clients' home by the consumer (see Figure 5).

The distribution stage impacts depend mainly on supply chain specifics (e.g. local, intracontinental and international supply chains), corresponding transport modes and utilisation ratios, and distances covered, as well as product weights and volumes.

The following transport processes (adapted from the PEF method) are considered for apparel and footwear, with the number in brackets matching Figure 5above:

- From factory to the final client (D2C) [1];
- From factory to warehouse/ distribution centre (DC) located in Europe [2];
- From a warehouse/ distribution centre located in Europe to a local warehouse/ distribution centre [3a];
- From local warehouse/ distribution centre to final client [3b];
- From warehouse/ distribution centre located in Europe to retail/ stores[4a]; and
- From retail/ stores to the final client (consumer travel) [4b].

The distribution impacts are based on:

a) the distance travelled
b) the mass of the product being transported (ton kilometre (tkm)).

<u>Distribution</u>

The weight transported is defined as the sum of the product weight plus all removable accessories such as price tags, cardboard brand tags etc. and packaging.

The mass of the real load divided by the mass of the payload gives the utilisation ratio. The default utilisation ratio is given as 64% for a truck. The number of empty returns (i.e. the ratio of the distance travelled to collect the next load after unloading the product to the distance travelled to transport the product) is included and already taken into account, therefore the utilisation ratio shall not be modelled separately.

The default values per functional unit provided in Table 33 shall be used for all apparel and footwear sub-categories, unless primary data are used.

Should the company conducting the study exceed the default air cargo distances or provenance by more than 50%, primary data shall be used for both the provenance and the distance, and the provenance of the other transport modes be adjusted keeping the same ratio.

For example: a company ships a pair of boots directly to the consumer who is 16'000 km away. This exceeds the default 10'000 km by air included in Table 33. Company specific data (16'000 km, same provenance ratios) shall then be used in the PEF study.

Note that the specific distances for ship and plane transport should be determined by using the following calculators:

- https://www.searates.com/services/distances-time/
- https://co2.myclimate.org/en/flight_calculators/new/

If internal tools are available to calculate transportation distances, i.e. using origin and destination codes enabling bulk assessments, these can be used as well if equally or more accurate than the calculators listed above.

The following values shall be used when modelling the different distribution scenarios, unless primary data are used:

- Products sold through retail stores – 62%;
- Products sold through "classic" e-commerce - 34%;
- Products sold directly to the final client – 4%.

The default values for the transport process from retail/ stores to the final client in Table 33 are given as roundtrip distances. LCA datasets for consumer travel are per kilometre.

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Table 33 Default transport parameters per product

No.	Transport process	Default per functional unit				
		Supply chain location	Distance (km)	Utilisation ratio	Provenance (% of total transport)	Transport mode
1	Factory to final client (direct-to-consumer)	Local	1’200	64%	5%	Truck (>32t, EURO 4)
		Intracontinental	3’500	64%	15%	Truck (>32t, EURO 4)
		International (ship)	1’000	64%	0%	Truck (>32t, EURO 4)
			18’000	n/a		Ship (transoceanic container)
		International (plane)	1’000	64%	80%	Truck (>32t, EURO 4)
			10’000	n/a		Cargo plane
2	Factory to warehouse/ DC located in Europe	Local	1’200	64%	5%	Truck (>32t, EURO 4)
		Intracontinental (barge)	2’500	64%	3%	Truck (>32t, EURO 4)
			800	n/a		Ship (barge)
		Intracontinental (train)	800	64%	14%	Truck (>32t, EURO 4)
			2’500	n/a		Train (average freight train)
		International (ship)	1’000	64%	66%*	Truck (>32t, EURO 4)
			18’000	n/a		Ship (transoceanic container)
		International (plane)	1’000	64%	10%*	Truck (>32t, EURO 4)
			10’000	n/a		Cargo plane
		International (train)	1’000	64%	2%	Truck (>32t, EURO 4)
			10’000	n/a		Train (average freight train)
3a	From warehouse/ DC located in Europe to local warehouse/ DC	Intracontinental (plane)	500	64%	100%	Truck (>32t, EURO 4)
			3’500	n/a		Cargo plane
3b	From local warehouse/ DC to final client	Local	250 (round trip)	20%/ *50%***	100%	Van (lorry <7.5t, EURO 3)
4a	From warehouse/ DC located in Europe to retail/ stores	Local	1’200	64%	100%	Truck (>32t, EURO 4)
4b		Local	5	See below	62%	Passenger car (average)

	From retail/ stores to final client (consumer travel)		5	20%/50%**	5%	Van (lorry <7.5t, EURO 3)
			N/A	N/A	33%	No impact modelled (walking, cycling etc)

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* calculated with values based on McKinsey (2020b)

**utilisation ratio for a van (lorry <1.2t, EURO 3)

Consumer travel

The impacts from consumer travel (allocation of the car impact) shall be based on volume (PEF method). For an average car, the maximum volume that can be transported is 0.2 m^3, which equals 1/3 of a 0.6 m^3 trunk, whereas for products bigger than 0.2 m^3 the full car transport impact shall be included. Considering products that are sold through shopping malls, the volume of the product (including all packaging) shall be used to allocate the transport burdens, and the allocation factor shall be calculated as the volume of the product divided by the maximum volume of 0.2 m^3.

The default value for the volume is specified below (primary data provided by Balzac, Nov. 2020).

Table 34 Default representative product volumes

No.	Sub-category	Default product volume (m^3)
1	T-shirts	0.0018
2	Shirts and blouses	0.006
3	Sweaters and midlayers	0.0102
4	Jackets and coats	0.015
5	Pants and shorts	0.004
6	Dresses, skirts and jumpsuits	0.007
7	Leggings, stockings, tights and socks	0.0006
8	Underwear	0.0006
9	Swimsuits	0.0006
10	Apparel accessories	0.0012
11	Open-toed shoes	0.0048
12	Closed-toed shoes	0.018
13	Boots	0.024

6.3.2. Storage at warehouse/ DC and retail/ store

The impacts generated by the storage of final products in warehouses or retail locations/stores are related to energy for heating and lighting, and waste associated with lost products and packaging.

No energy and waste differentiation are needed between apparel and footwear product sub-categories as usually a variety of products are stored and sold in the same warehouse or retail setting (ambient storage). This gives consistency of the energy inputs per unit sold within the chosen reference flow.

The emissions and resources used by storage systems shall be allocated to the product stored, and the allocation be based on the space (in m^3) and time (in weeks) occupied by the product.

The default data (from the PEF method) in Table 35 for electricity consumption (kWh/ m2*year) and storage capacity shall be used for all apparel and footwear sub-categories, unless primary data are used.

Table 35 Default storage capacity and energy consumption for warehouse/DC and retail/stores

	Storage capacity (ambient)	Storage time	Default storage capacity	Energy consumption (ambient)
Warehouse/ distribution centre	48'000 m^3	7 weeks (based on OEFCRs retail, 2018 and data received)	3'120'000 m^{3*}weeks/ year	30 kWh/ m^2*year 360 MJ natural gas/ m^2*year
Retail/ stores	2'000 m^3		104'000 m^3*weeks/ year	150 kWh/ m^2*year

Default product-specific volume provided in Table 34) shall be used to calculate the allocation factor given as the ratio between the product volume*time and storage capacity volume*time, unless primary data are used. Additionally, a storage volume factor of 4 is used for ambient storage to account for the additional space the product takes in the storage facility, meaning the product volume will be multiplied by 4.

6.3.3. Product returns and deadstock

Returns shall be taken into account for both scenarios by multiplying the distances by the percentage of the returns. The following return default values shall be used (SAC data, 2022):

- E-commerce scenario 28%
- Retail/ in-store sales scenario 7%

In the e-commerce scenario, the last transport step (scenario 3b in Table 33) shall be multiplied with the default percentage of returns via e-commerce (28%).

In the direct-to-consumer scenario, it is assumed that the return process matches the e-commerce scenario, and that the product is returned to a local warehouse rather than to the initial factory.

Finally, in the retail scenario, the percentage of product returns has an influence on the distance travelled by the consumer and needs to be taken into account.

In this life cycle stage, deadstock as defined in Section 6.1.6 shall be included for the business distribution steps, excluding any transportation to the consumer (steps 1, 3b and 4b from Figure 5 of the PEFCR). For example, a 20% deadstock rate will mean that the weight of the final product transported will be multiplied by 1.2 per product for the transport steps outlined above.

6.3.4. Distribution losses and waste

A default loss rate of 1% shall be used for the distribution stage for all apparel and footwear sub-categories, unless primary data are used.

The losses are modelled based on the total quantity of product that leaves the factory compared to the quantity that arrives in sellable condition at the point of sale.

6.3.5. Repair distribution

When a repairability multiplier as defined in Section 3.3.3.2 is used, transport shall be calculated according to scenario 4b described in Section 6.3.1 accounting for the return trip of the retail to consumer transportation.

As a proxy, the percentage of products being repaired shall match the repairability multiplier. For example, if the repairability multiplier is 1.05 (105%), additional transportation impacts for 10% (5% transported one way then the other) shall be included.

6.4. Use stage

[The PEFCR shall provide a clear description of the use stage and list all processes taking place therein (according to the model of the RP) according to the table provided below. The table may be adapted by the TS as appropriate.]

Note	Use stage processes will be provided as an Excel file in an appendix after the supporting studies. See Table 17 as an example.

The user of the PEFCR shall report the DQR values (for each criterion + total) for all the datasets used.

[In this section the PEFCR shall also list all technical requirements and assumptions that the user of the PEFCR shall apply. The PEFCR shall state if a delta approach is used for certain processes. In case the delta approach is used, the PEFCR shall state the minimum consumption (reference) to be used when calculating the additional consumption allocated to the product.]

This PEFCR uses the main function approach. The use stage for apparel considers impacts related to the following steps for most of the sub-categories:

- Washing and cleaning
- Drying
- Ironing and steaming

These processes of the apparel use stage are product dependent.

The impacts related to the following steps are considered for footwear:

- Care

Further details on material-specific requirements for the use stage per each representative product are described below.

For apparel products, the care label typically provides washing instructions. While the care label shows instructions such as the maximum temperature a product can withstand, this does not necessarily mean that the product is washed at that temperature, it may in fact be washed at a lower temperature. Similarly, a product may not be ironed even if the care label indicates an ironing temperature. For this reason, the use stage shall be modelled using the default values presented in the sections below.

For the use stage the consumption grid mix shall be used. The electricity mix shall reflect the ratios of sales between EU countries/ regions. To determine the ratio a physical unit shall be used (e.g. kg of product). Where such data are not available, the average EU consumption mix (EU27 + UK + EFTA), or region-representative consumption mix, shall be used.

6.4.1. Washing / cleaning

According to the PEFCR for leather (Leather PEFCR, 2020), specific garment use instructions shall be followed for leather and fur products. In general, leather articles will not be washed, dried, ironed or steamed.

Washing types and temperatures

The default washing types and typical washing temperatures provided in Table 36 below (Laitala, 2018a, Cotton Incorporated, 2020) shall be used for all apparel sub-categories. The default temperature corresponds to the temperature of the main washing type, for example for underwear with the main washing type being washing machine and the default temperature being set to 60°C.

Table 36 Default washing types and specific instructions

No.	Product sub-category	Product details	Temp. (°C)	% Hand-washing	% Machine washing	% Dry cleaning
1	T-shirts	**All materials**	**40°C**	**6%**	**89%**	**5%**
		Cotton and blends	40°C	8%	90%	2%
		Wool, blends and silk	30°C	18%	57%	25%
		Synthetics	40°C	9%	88%	3%
		Regen. cellulose	Use average	22%	73%	5%
2	Shirts and blouses	**All materials**	**40°C**	**8%**	**81%**	**11%**
3	Sweaters and midlayers	**All materials**	**30°C**	**22%**	**64%**	**14%**
4	Jackets and coats	**All materials**	**40°C**	**20%**	**60%**	**20%**
		Cotton and blends	Use average	13%	63%	25%
		Wool, blends and silk	30°C	23%	24%	64%
		Synthetics	Use average	13%	61%	26%
		Regen. cellulose	Use average	16%	65%	18%
5	Pants and shorts	**All materials**	**40°C**	**6%**	**75%**	**19%**
		Cotton and blends	Use average	13%	63%	25%
		Wool, blends and silk	30°C	23%	24%	64%
		Synthetics	Use average	13%	61%	26%
		Regen. cellulose	Use average	16%	65%	18%
6	Dresses, skirts and jumpsuits	**All materials**	**40°C**	**17%**	**69%**	**14%**
7	Leggings, stockings, tights and socks	**All materials**	**60°C**	**10%**	**85%**	**5%**
		Cotton and blends	Use average	16%	83%	1%
		Wool, blends and silk	30°C	25%	66%	10%
		Synthetics	Use average	24%	75%	1%
		Regen. cellulose	Use average	47%	50%	2%

No.	Product sub-category	Product details	Temp. (°C)	% Hand-washing	% Machine washing	% Dry cleaning
8	Underwear	**All materials**	**60°C**	**12%**	**86%**	**2%**
9	Swimwear	**All materials**	**30°C**	**100%**	**0%**	**0%**
10	Apparel accessories	**All materials**	**30°C**	**29%**	**47%**	**24%**
		Hat	30°C	29%	56%	14%
		Scarves	30°C	28%	33%	39%
		Gloves	30°C	28%	59%	13%
		Belts	n/a	n/a	n/a	n/a

This table does not apply to leather products.

The washing datasets from the EF database shall be used.

Washing frequency

The default frequency of washing presented in Table 37 below (key data for a standard consumer, based on data from Laitala (2020), Sandin (2019), and Daystar (2019)) shall be used.

Table 37 Product uses prior to washing

No.	Sub-category	Average uses prior to washing	**Average uses prior to washing for sportswear***	**Average uses prior to washing for delicates****
1	T-shirts	1	1	5
2	Shirts and blouses	2	1.5	5
3	Sweaters and midlayers	5	1.5	5
4	Jackets and coats	20	1.5	5
5	Pants and shorts	3	1.5	5
6	Dresses, skirts and jumpsuits	3	1.5	5
7	Leggings, stockings, tights and socks	2	1.5	5
8	Underwear	1	1	1
9	Swimsuits	1	1	5
10	Apparel accessories	20	20	20

This table does not apply to leather products. Sportswear is defined as garments primarily worn for sports activities, both indoor and outdoor (*Laitala, 2018b), and delicate garments are defined as items requiring dry cleaning only based on their care label (**FHCM, 2019).

6.4.2. Drying

The default frequency of drying indicated in Table 38 (Laitala, 2020) shall be used. This table is built on average tumble-drying rates, taking into account garments that are only air dried (e.g. made of wool, delicates, etc).

Table 38 Data for drying per product sub-category

No.	Sub-category	Air drying	Tumble drying
1	T-shirts	70%	30%
2	Shirts and blouses	88%	12%
3	Sweaters and midwear	70%	30%
4	Jackets and coats	75%	25%
5	Pants and shorts	70%	30%
6	Dresses, skirts and jumpsuits	88%	12%
7	Leggings, stockings, tights and socks	88%	12%
8	Underwear	65%	35%
9	Swimsuits	88%	12%
10	Apparel accessories	88%	12%

This table does not apply to leather products.

6.4.3. Ironing / steaming

The default ironing and steaming data presented in Table 39 (Laitala, 2018a; Daystar, 2019; Sandin, 2019) shall be used for all apparel sub-categories. Values provided in the table below are representative of ironing per cleaning cycle, taking into account garments that are not ironed (e.g. made of wool, delicates, etc). Therefore ironing is assumed after each wash.

Table 39 Data for ironing and steaming

No.	Sub-category	% of garments ironed or steamed per use	Time spent per garment (min)
1	T-shirts	40%	2.6
2	Shirts and blouses	70%	2.6
3	Sweaters and midlayers	0%	n/a
4	Jackets and coats	5%	4
5	Pants and shorts	63%	4.3
6	Dresses, skirts and jumpsuits	18%	4.5
7	Leggings, stockings, tights and socks	5%	3.4
8	Underwear	1%	1
9	Swimsuits	0%	n/a

No.	Sub-category	% of garments ironed or steamed per use	Time spent per garment (min)
10	Apparel accessories	25%	2.0

This table does not apply to leather products.

6.4.4. Footwear care

While washing footwear in a washing machine is discouraged by footwear brands, it is assumed that consumers wash their shoes once during the shoe's lifetime (SAC and thinkstep, 2016), using a dedicated delicate cycle. No data on frequency of care for footwear being available, a conservative approach has been used and 100% of closed-toed shoes and boots are receiving care every 10 uses (expert judgement).

Note	Footwear cleaning and care will be adapted upon receiving the EF 3.0 database. Leather open-toed shoes would also receive care. However, several assumptions would need to be taken to define a default care cycle for this product category. It will be investigated further after the supporting studies if footwear care cannot be excluded as a cut-off.

6.4.5. Repairability and use stage modelling

When a repairability multiplier as defined in Section 3.3.3.2 is used, the repair shall be modelled using the apparel or footwear repair for reuse dataset.

As a proxy, the percentage of products being repaired shall match the repairability multiplier. For example, if the repairability multiplier is 1.05 (105%), repair impacts shall be included for 5% of the product.

6.4.6. Extended lifetime and circularity

According to Section 4.4.9 of the PEF method (2019), if a product is re-used with the same specifications (same function), this re-use shall be considered as an extension of the use stage of the product. The aspects related to this lifetime extension are discussed in Section 3.3.2.

According to the PEF method:

The following processes are excluded from the use stage:

*(d) **If a product is reused** (see also Section 4.4.9.2), the processes needed to collect the product and make it ready for the new use cycle are excluded (e.g. the impacts from collection and cleaning reusable bottles). These processes are included in the EoL stage if the product is reused into a product with different specifications (see Section 4.4.9 for further details). If the product lifetime is extended into a product with original product specifications (providing the same function) these processes shall be included in the FU and reference flow.*

6.5. End of life

The end of life stage begins when the product in scope and its packaging is discarded by the user and ends when the product is returned to nature as a waste product or enters another product's life cycle (i.e. as a recycled input). In general, it includes the waste of the product in scope, such as the food waste, and primary packaging.

Other waste (different from the product in scope) generated during the manufacturing, distribution, retail, use stage or after use shall be included in the life cycle of the product and modelled at the life cycle stage where it occurs.

[The PEFCR shall list all technical requirements and assumptions that the user of the PEFCR shall apply. Furthermore, it shall list all processes taking place in this life cycle stage (according to the model of the RP) according to the table provided below. The table may be adapted by the TS as appropriate (e.g. by including relevant parameters of the Circular Footprint Formula). Please note that the transport from collection place to EoL treatment may be included in the landfill, incineration and recycling datasets: the TS shall check if it is included in the default datasets provided. However, there might be some cases, where additional default transport data are needed and thus shall be included here. The PEF method provides default values to be used in case no better data are available.]

Note	End of life processes will be provided as an Excel file in an appendix after the supporting studies. See Table 17 as an example.

The user of the PEFCR shall report the DQR values (for each criterion + total) for all the datasets used.

The end of life shall be modelled using the Circular Footprint Formula and rules provided in chapter 'End of life modelling' of this PEFCR and in the PEF method, together with the default parameters listed in Table 23 *to* Table 26*.*

Before selecting the appropriate R2 value, the user of the PEFCR shall carry out an evaluation for recyclability of the material. The PEF study shall include a statement on the recyclability of the materials/ products. The statement on recyclability shall be provided together with an evaluation for recyclability that includes evidence for the following three criteria (as described by ISO 14021:1999, Section 7.7.4 'Evaluation methodology'):

1. *The collection, sorting and delivery systems to transfer the materials from the source to the recycling facility are conveniently available to a reasonable proportion of the purchasers, potential purchasers and users of the product;*
2. *The recycling facilities are available to accommodate the collected materials;*
3. *Evidence is available that the product for which recyclability is claimed is being collected and recycled.*

Point 1 and 3 can be proven by recycling statistics (country specific) derived from industry associations or national bodies. Approximation to evidence at point 3 can be provided by applying for example the design for recyclability evaluation outlined in EN 13430 Material recycling (Annexes A and B) or other sector-specific recyclability guidelines if available.

Following the evaluation for recyclability, the appropriate R2 values (supply-chain specific or default) shall be used. If one criterion is not fulfilled or the sector-specific recyclability guidelines indicate limited recyclability, an R2 value of 0% shall be applied.

Company-specific R2 values (measured at the output of the recycling plant) shall be used, if available. If no company-specific values are available and the criteria for the evaluation of recyclability are fulfilled (see below), application-specific R2 values shall be used as listed in Table 25 and Table 26 above*.*

- *If an R2 value is not available for a specific country, the European average shall be used.*

- *If an R2 value is not available for a specific application, the R2 values of the material shall be used (e.g. materials average).*
- *In case no R2 values are available, R2 shall be set equal to 0 or new statistics may be generated in order to assign an R2 value in the specific situation.*

The applied R2 values shall be subject to the PEF study verification.

[The PEFCR shall list in a table all the parameters to be used by the user to implement the CFF, distinguishing between those that have a fixed value (to be provided in the same Table; from the PEF method or PEFCR-specific) and those that are PEF study-specific (e.g. R2, etc.). Furthermore, the PEFCR shall include additional modelling rules derived from the PEF method, if applicable. Within this table, the B value shall be equal to 0 as default.]

[PEFCRs that include reusable packaging shall include the following: "The reuse rate determines the quantity of packaging material (per product sold) to be treated at the end of life. The amount of packaging treated at the end of life shall be calculated by dividing the actual weight of the packaging by the number of times this packaging was reused."]

Instructions on end-of-life modelling can mostly be found in other sections of the PEFCR:

- An extension of lifetime (for example through reuse) is not considered to be an end-of-life scenario. More information can be found in Section 3.3.2;
- The modelling of the end-of-life scenario should include the transportation, collection and sorting when applicable, and follow the CFF formula, as presented in Section 5.10.

Company-specific data for deadstock shall be collected as indicated in Section 5.1.5.
The end-of-life fate based on company-specific data shall be modelled according to Section 5.10 (CFF formula) for the specific shares of incinerated, landfilled, and recycled deadstock.
The end-of-life fate of the reused share of deadstock will be unknown, and as such shall be modelled using the default assumptions illustrated in Figure 3 and Figure 4.

6.5.1. Collection and transport

At the end of life, apparel and footwear products are either directly disposed of through municipal waste collection or collected prior to being sorted and treated as shown in Figure 6.

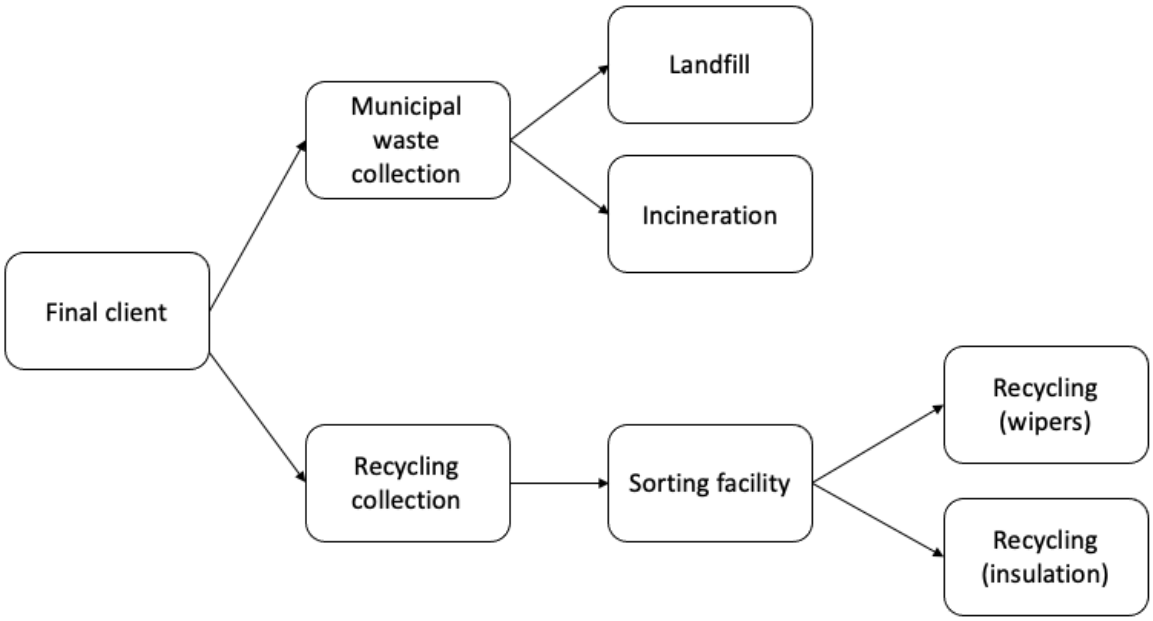

Figure 6 End-of-life fate scenarios

For the transport from the client to the recycling collection point, the allocation factor is calculated as the volume of the product divided by the maximum volume (0.2 m^3 for a passenger car), as presented in Table 40.

Table 40 Default representative product volumes

No.	Sub-category	Default product volume (m^3)	Allocation
1	T-shirts	0.0018	0.009
2	Shirts and blouses	0.006	0.03
3	Sweaters and midlayers	0.0102	0.051
4	Jackets and coats	0.015	0.075
5	Pants and shorts	0.004	0.02
6	Dresses, skirts and jumpsuits	0.007	0.035
7	Leggings, stockings, tights and socks	0.0006	0.003
8	Underwear	0.0006	0.003
9	Swimsuits	0.0006	0.003
10	Apparel accessories	0.0012	0.006
11	Open-toed shoes	0.0048	0.024
12	Closed-toed shoes	0.018	0.09
13	Boots	0.024	0.12

The default transport means and distances presented in Table 41 shall be used (PEF method) unless primary data are used. The collection rate is based on the percentages presented in Figure 3 and Figure 4 , excluding the reuse rate.

Table 41 Default transport parameters for apparel end of life

Supply chain	Distance (km)	Utilisation ratio	Provenance (% of total transport)	Transportation mode
Municipal waste collection				
Final client to landfill	30	64%	80.5%	Truck (>32 t, EURO 4)
Final client to incineration	30	64%	80.5%	Truck (>32 t, EURO 4)
Recycling collection				
Final client to collection point	1	n/a	19.5%	Passenger car
Collection point to sorting point	130	64%	19.5%	Truck (>32 t, EURO 4)
	240	n/a		Train (average freight train)
	270	n/a		Ship (barge)
Sorting point to recycling	100	64%	16.9%	Truck (>32 t, EURO 4)
Sorting point to incineration	30	64%	2.6%	Truck (>32 t, EURO 4)

Note	The design for recycling section has been removed as it wasn't impacting calculations and will require additional work. It will be brought back following the supporting studies following additional TS discussions.

7. PEF results

7.1. Benchmark values

[Here the TS shall report the results of the benchmark for each representative product. The results shall be provided characterised, normalised, and weighted (as absolute values), each in a different table, according to the template provided below. Results shall also be provided as a single overall score, based on the weighting factors provided in Section 5.2.2 of the PEF method.]

Note	Detailed tables for the 13 representative products can be found in the PEF-RP study. Tables will be provided in this section after the last update of the PEF-RP study.

7.2. PEF profile

The user of the PEFCR shall calculate the PEF profile of its product in compliance with all requirements included in this PEFCR. The following information shall be included in the PEF report:

- *full life cycle inventory;*
- *characterised results in absolute values, for all impact categories (as a table);*
- *normalised results in absolute values, for all impact categories (as a table);*
- *weighted result in absolute values, for all impact categories (as a table);*
- *the aggregated single overall score in absolute values.*

Together with the PEF report, the user of the PEFCR shall develop an aggregated EF compliant dataset of its product in scope. This dataset shall be made available to the European Commission. The disaggregated version may remain confidential.

7.3. Classes of performance

[The identification of classes of performance is not obligatory. Each TS is free to define a method to identify the classes of performance, in case they deem it appropriate and relevant. In case classes of performance are identified, they shall be described and provided in this section. Please refer to Section A.5.2 of the PEF method for further guidance.]

Note	To be completed at a later stage if required.

8. Verification

The verification of an EF study/ report carried out in compliance with this PEFCR shall be done according to all the general requirements included in Section 8 of the PEF method, including Annex A and the requirements listed below.

The verifier(s) shall verify that the PEF study is conducted in compliance with this PEFCR.

In case policies implementing the PEF method define specific requirements regarding verification and validation of PEF studies, reports and communication vehicles, the requirements in said policies shall prevail.

The verifier(s) shall validate the accuracy and reliability of the quantitative information used in the calculation of the study. As this can be highly resource intensive, the following requirements shall be followed:

- *The verifier shall check if the correct version of all impact assessment methods was used. For each of the most relevant impact categories, at least 50% of the characterisation factors (for each of the most relevant EF impact categories) shall be verified, while all normalisation and weighting factors of all impact categories shall be verified. In particular, the verifier shall check that the characterisation factors correspond to those included in the EF impact assessment method the study declares compliance with;*
- *The cut-off applied (if any) fulfils the requirements of this PEFCR and the PEF method;*
- *All the newly created datasets shall be checked on their EF compliance (for the meaning of EF compliant datasets refer http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml). All their underlying data (elementary flows, activity data and sub processes) shall be validated;*
- *The aggregated EF compliant dataset of the product in scope (meaning, the EF study) is made available to the European Commission.*
- *For at least 70% of the most relevant processes (by number) in situation 2 option 2 of the DNM, 70% of the underlying data shall be validated. The 70% of data shall include all energy and transport sub-processes for processes in situation 2 option 2;*
- *For at least 60% of the most relevant processes (by number) in situation 3 of the DNM, 60% of the underlying data shall be validated;*

- *For at least 50% of the other processes (by number) in situation 1, 2 and 3 of the DNM, 50% of the underlying data shall be validated.*

In particular, verifier(s) shall verify if the DQR of the process satisfies the minimum DQR as specified in the DNM for the selected processes.

These data checks shall include, but should not be limited to, the activity data used, the selection of secondary sub-processes, the selection of the direct elementary flows and the CFF parameters. For example, if there are 5 processes and each one of them includes 5 activity data, 5 secondary datasets and 10 CFF parameters, then the verifier(s) has to check at least 4 out of 5 processes (70%) and, for each process, (s)he shall check at least 4 activity data (70% of the total amount of activity data), 4 secondary datasets (70% of the total amount of secondary datasets), and 7 CFF parameters (70% of the total amount of CFF parameters), i.e. the 70% of each of data that could be subject to a check.

The verification of the PEF report shall be carried out by randomly checking enough information to provide reasonable assurance that the PEF report fulfils all the conditions listed in Section 8 of the PEF method, including Annex A.

[The PEFCR may specify additional requirements for the verification that should be added to the minimum requirements stated in this document].

Note	To be completed at a later stage if required.

References

[List the references used in the PEFCR.]

ADEME (2016). General principles for an environmental communication on mass-market products – Part 23: Methodology for the environmental impact assessment of clothing products.

ADEME, E. Fangeat, C. Chauvin, and le pôle usage et durée de vie (2016). "Allongement de la durée de vie des produits," Angers.

Benkirane, R. (2019). De l'importance de la durée de vie pour l'écoconception des textiles : contribution méthodologique. Thèse de doctorat, Lille.

Benkirane, R., Thomassey, S., Koehl, L., Perwuelz, A. (2019). A consumer-based textile quality scoring model using multi-criteria decision making. Journal of Engineered Fibers and Fabrics, Volume 14: 1–12

Beton, A., Dias, D., Farrant, L. (2014). Environmental Improvement Potential of Textiles (IMPRO Textiles) https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/environmental-improvement-potential-textiles-impro-textiles , last consulted 11/11/2020

Cline, E (2019). "The Conscious Closet"

Confederation of British Industry, 2020:

https://www.cbi.eu/market-information/apparel/recycled-fashion/market-potential#:~:text=Overall%2C%20in%20the%20EU%2C%20only,is%20made%20into%20industrial%20rags , last consulted 11/11/2020

Cotton Incorporated (2020). EU consumer survey

Daystar, J., Chapman, L., Marguerite, M. (2019). Quantifying Apparel Consumer Use Behavior in Six Countries: Addressing a Data Need in Life Cycle Assessment Modeling.

De Saxcé, M. (2012)."Méthodologie d'évaluation des impacts environnementaux des textiles par l'Analyse du Cycle de Vie," Université de Lille Nord de France.

DIA- Dry cleaning Institute of Australia Ltd (2015) The International Fair Claims Guide for Consumer Textile Products is a, Alexandria, Australia.

Eberle, H (2004). Clothing Technology, from fibre to fashion, 4th English edition.

EcoTLC (2019). Critères de durabilité ; mise en marche https://www.ecotlc.fr/ressources/Criteres_durabilite_EM1_mises_en_marche_2019.pdf

European Union (2017). Ecodesign and Energy label revision: Household Washing machines and Washer-dryers

Eurostat 2015a: http://epp.eurostat.ec.europa.eu/portal/page/portal/environment/data/main_tables

Eurostat 2015b: https://ec.europa.eu/eurostat/web/international-trade-in-goods/data/database

Eurostat 2020. https://ec.europa.eu/eurostat/web/products-eurostat-news/-/EDN-202004241#:~:text=The%20EU%20Member%20States%20imported,increased%20in%20value%20by%2062%25

FHCM (2019). Metrics for the Sustainability Index.

GINETEX (2019). Durability of clothes: a major concern for Europeans.

Gore (2013). Life Cycle Assessment of a GORE branded waterproof, windproof and breathable jacket.

Gore (2020). Importance of durability testing. Position paper Gore on durability.

IWTO (2020). Discussion paper -- Clothing Care Frequency.

Kaushik, V., Ashwani,K.,Himanshu, G., Dixit, G. (2020). Modelling and prioritizing the factors for online apparel return using BWM approach, Electronic Commerce Research 1-31.

Klepp, I.G. , K. Laitala, S.G. Wiedemann, R. Kettlewell, A.H.M. Ireland, (2020). Discussion paper - Accounting for clothing designed for a long life. Position paper IWTO on durability.

Laitala, K., Klepp, I. G., & Henry, B. (2018a). Use phase of apparel: A literature review for Life Cycle Assessment with focus on wool.

Laitala, Klepp, and Henry. (2018). Does Use Matter? Comparison of Environmental Impacts of Clothing Based on Fiber Type. http://www.mdpi.com/2071-1050/10/7/2524.

Laitala, K., Klepp, I. G., Kettlewell, R. & Wiedemann, S. (2020). Laundry Care Regimes: Do the Practices of Keeping Clothes Clean Have Different Environmental Impacts Based on the Fibre Content?

McKinsey (2019). Online as the key frontline in the European fashion market

McKinsey (2020 a). What got us here won't get us there: A new model for the consumer goods industry

McKinsey (2020 b). Fashion on climate: How the fashion industry can urgently act to reduce its greenhouse gas emissions

Pasquet, V. (2012). "Contribution à l'étude de l'impact environnemental de procédés de traitements de textiles par l'outil d'analyse du cycle de vie," Université Lille Nord de France.

Product Environmental Footprint Category Rules (PEFCR) Leather. Version 2.0 (2020): https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_leather.pdf and https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_leather_Errata%202.0.pdf

Product Environmental Footprint Category Rules (PEFCR) T-Shirts. Version 1.0 (2019): https://ec.europa.eu/environment/eussd/smgp/pdf/PEFCR_tshirt.pdf

SAC, (2020). Higg Product Module Methodology.

SAC and thinkstep (2016). First Draft Product Environmental Footprint Category Rules (PEFCR). Non-Leather Footwear: https://apparelcoalition.org/wp-content/uploads/2016/06/PEFCR-draft-June-8-for-SC-review-copy.pdf

SAC Higg Product Module (PM) Methodology, version September (2019)

Saleh, M. A. E. H. (2012). An investigation of the relationship between unplanned buying and post-purchase regret. International Journal of Marketing Studies, 4(4), 106

Sandin, G., Roos, S., Spak B., Zamani B., Peters, G. (2019). Environmental assessment of Swedish clothing consumption. ISBN:978-91-89049-05-5 Mistra Future Fashion report number: 2019: 05

Sympatex (2020). Leave no stone unturned – towards a holistic Circular Economy. Position paper Sympatex on circular economy.

Textile Exchange (2020). Material Change Insights Report. https://textileexchange.org/wp-content/uploads/2020/05/Material-Change-Insights-Report-2019_Final.pdf

Textile Exchange (2020a). Preferred Fiber & Materials Market Report.

Textile Exchange (2020b). Organic Cotton Market Report.

The Nielsen Company (2012a). AWI – Wardrobe Ethnographic Interviews. Topline Reports for Australia, China, Italy, Japan Korea, United Kingdom and The United States of America.

The Nielsen Company (2012b). Ethnographies Report with Topline Qualitative Reports by Country (USA, UK, Italy, Japan, China, Korea and Australia).

The Nielsen Company (2012c). Global Wardrobe Audit - All Countries: Prepared for Australian Wool Innovation by The Nielsen company.

The World Footwear 2016 Yearbook (2016).

https://www.worldfootwear.com/publications/?documento=14081877/37615558&fonte=ISSUU

World Apparel & Footwear Life Cycle Database (WALDB) https://quantis-intl.com/metrics/databases/waldb-apparel-footwear/

WRAP (2014). Clothing Longevity Protocol.

Zampori, L. and Pant, R. (2019). Suggestions for updating the Product Environmental Footprint (PEF) method, EUR 29682 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-76- 00654-1, doi:10.2760/424613, JRC115959.

ANNEX I - List of EF normalisation and weighting factors

Global normalisation factors are applied within the EF. The normalisation factors as the global impact per person are used in the EF calculations.

[The TS shall provide the list of normalisation and weighting factors that the user of the PEFCR shall apply. Normalisation and weighting factors are available at: http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml]

ANNEX II – PEF study template

[The PEFCR shall provide as an annex a checklist listing all the items that shall be included in PEF studies, using the PEF study template available as Annex E of the PEF method. The items already included are mandatory for every PEFCR. In addition, each TS may decide to add additional points to the template.]

ANNEX III – Review reports of the PEFCR and PEF-RP(s)

[Insert here the critical review panel reports of the PEFCR and PEF-RP(s), including all findings of the review process and the actions taken from TS to answer the comments of the reviewers.]

ANNEX IV – Designing the representative product model

[The TS may decide to add other Annexes that are considered important].

[The PEFCR shall include a description of the representative product(s) and how it has been derived. The TS shall provide in an Annex to the PEFCR information about all the steps taken to define the "model" of the RP(s) and report the information gathered].

Given the large number of products considered, significant reflection within the TS was required to determine the product sub-categories. The following high-level principles for decision making were used:

1. How similar are the product functions?
    - For example, no one would choose a sneaker instead of a hat.
2. Which products could provide the same function but may be selected over another for a specific reason?
    - One would choose to wear leggings to go running and not dress pants.
    - To go to the office, one could choose to wear jeans or dress pants.
3. Can each product fit only within one sub-category?
    - If we had sub-categories for fashion and boots, where would a tall leather dress boot fit?
4. How many products are included in one sub-category?
    - If one sub-category accounts for a significant market share, sub-division may be justified.
5. Would the hotspots be similar for products within the sub-category?
    - The aim would be to avoid having one product at one end of the scale within a sub-category.
    - However, this could lead to splitting the categories by use (e.g., casual, fashion, sports), size or material which increases the workload exponentially.

After this exercise and discussions, the apparel and footwear PEFCR were classified into 13 product sub-categories, defined as products that can fulfil equivalent functions and applications as defined by the PEF method.

Due to the relative market sales of accessories compared to other apparel and footwear products, the TS could not justify separating accessories into unique product sub-categories as this would significantly increase the workload.

Products included in each sub-category and a description of each RP is included in Table 5. For the definition of RP BOMs, each sub-category is divided into two to five products matching the categorization of market data available from EURATEX for the identification of product representativeness on the European market as described below.

Bill of materials (BOM)

For each sub-category, key products were identified based on market shares of apparel and footwear products sold in Europe (EURATEX data).

The market splits used within this study are representative of apparel and footwear products produced in and imported to Europe, minus products that were exported from Europe, and were calculated based on product volumes. The main product groups identified per sub-category based on the market shares data from EURATEX are shown in Table 42 below.

Table 42 Market sales share of top products per sub-category

No.	Sub-category/ representative product	Products included	Market shares
1	T-shirts	T-shirts	99.6%
		Collared short-sleeved shirts	0.4%
2	Shirts and blouses	Long-sleeved shirts	75.8%
		Blouses	24.2%
3	Sweaters and midlayers	Jerseys and pullovers	50.9%
		Sweatshirts	17.1%
		Cardigans	22.3%
		Waistcoats	9.7%
4	Jackets and coats	Blazers/suit jackets	31.4%
		Rain jackets	11.0%
		Overcoats	7.3%
		Outdoor winter jackets	38.0%
		Light short jackets	12.3%
5	Pants and shorts	Pants	80.6%
		Shorts	19.4%
6		Dresses	60.0%

No.	Sub-category/ representative product	Products included	Market shares
	Dresses, skirts and jumpsuits	One-piece suits	14.1%
		Skirts	14.4%
		Robes	11.4%
7	Leggings, stockings, tights and socks	Pantyhose and tights	28.8%
		Hosiery	49.1%
		Socks	22.1%
8	Underwear	Underwear	81.2%
		Bras	18.1%
		Body-shaping suits	0.8%
9	Swimsuits	Women's swimwear	76.6%
		Men's swimwear	23.4%
10	Apparel accessories	Hats	42.2%
		Scarves and ties	2.1%
		Belts	9.9%
		Gloves and mittens	45.9%
11	Open-toed shoes	Casual /fashion sandals	57.0%
		Flip-flops	15.0%
		Open-toed slippers	19.8%
		Athletic sandals	8.2%
12	Closed-toed shoes	Casual /fashion shoes	70.0%
		Slippers	23.5%
		Protective shoes	1.0%
		Athletic shoes	5.5%
13	Boots	Casual /fashion boots	51.4%
		Protective boots	16.4%
		Polymer boots	14.0%
		Athletic boots	18.2%

Totals per RP may not reach 100% due to rounding.

The shares of each material in the average final product weight (g/product for apparel and g/pair for footwear) per functional unit are given in Table 43 for apparel (representative products 1-10) and Table 44 for the footwear product sub-categories (representative products 11-13).

Primary data at product level were collected from TS members for each product sub-category. TS members provided raw material inputs for key products, based on either highest volume products or average product data per product sold in Europe, using average sizes. Data collected from TS members were weighted based on their representativeness of an average product sold in the European market using market sales data provided by EURATEX, as well as the average fibre data from the TE Market Report on preferred fibre and materials (2020a).

Note	The animal origin of leather material inputs will be clarified when the EF 3.0 database is available.

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2294 Table 43 Bill of materials for the apparel representative products with the share (%) of each material based on the average product weight[23]

List of materials	RP1 T-shirts	RP2 Shirts & blouses	RP3 Sweaters & midlayers	RP4 Jackets & coats	RP5 Pants & shorts	RP6 Dresses, skirts and jumpsuits	RP7 Leggings, stockings, tights and socks	RP8 Underwear	RP9 Swimwear	RP10 Apparel accessories
Average weight [g/product]	**170**	**250**	**500**	**950**	**450**	**300**	**130**	**80**	**120**	**110**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Acrylic	-	-	5%	11%	-	-	7%	-	-	16%
Cashmere and camel hair	-	-	4%	0.9%	-	-	-	-	-	-
Cotton[24]	70%	55%	34%	15%	47%	54%	22%	70.5%	-	15%
Duck down	-	-	-	0.9%	-	-	-	-	-	-
Elastane	-	-	-	-	4%	-	9%	7%	9%	-
Fur	-	-	-	0.3%	-	-	-	-	-	-
Leather	-	-	-	0.9%	1%	-	-	-	-	7%
Linen	-	5%	-	-	4%	-	-	-	-	-
Polyamide	-	-	2%	15%	7%	4%	27%	10%	51%	4%
Polyamide recycled	-	-	-	-	-	-	4%	2%	-	-
Polyester and other synthetics[25]	21.3%	23.2%	21.7%	35.6%	30.9%	24.5%	18.8%	5.1%	37.6%	30.3%
Polyester recycled	2%	3%	4%	4%	3%	2%	2%	-	2%	-
PTFE	-	-	-	1.8%	-	-	-	-	-	-
Silk	-	-	-	-	-	-	-	-	-	1%
Viscose/ Modal/ Lyocell[26]	6%	13%	5%	4%	2%	13%	8%	5%	-	-
Wool	-	-	24%	9%	-	2%	2%	-	-	26%
Trims[27]	0.7%	0.8%	0.3%	1.6%	1.1%	0.5%	0.2%	0.4%	0.4%	0.7%

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[23] Totals per RP may not reach 100% due to rounding.
[24] Although data from the past years indicate an increased share of organic cotton on the European market (Textile Exchange, 2020b), the actual share of organic cotton in 2019 was 0.93% globally. Because of this very low share, organic cotton is included here in the cotton category.
[25] Other synthetics include aramid, copolyester, elastodiene, elastolefin, EVA, polyethylene, rubber synthetic.
[26] Because of the very similar production processes of viscose and Modal as well as the overall low share of Lyocell, these materials are grouped in the same category.
[27] Trims include buttons, hooks, tags, tapes, zippers, zip pullers, as relevant for each subcategory. The assumed material composition of trims is an equal share of PES, PET and metal.

Table 44 Bill of materials for the footwear representative products with the share (%) of each material based on the average product weight[28]

List of materials	RP11 Open-toed shoes	RP12 Closed-toed shoes	RP13 Boots
Average weight [g/pair]	**350**	**900**	**1100**
Total	**100%**	**100%**	**100%**
Wood-based non-woven	-	-	2%
Cork	5%	-	-
Cotton [29]	-	3%	-
EVA	28%	7%	-
Leather	17%	11%	21%
Metal	-	-	2%
Polyamide	-	3%	3%
Polyester and other synthetics[30]	3%	26%	13%
Polyester recycled	-	3%	2%
Polyurethane	8%	6%	10%
PVC	6%	6%	14%
Rubber natural	13%	8%	5%
Rubber synthetic	19%	16%	11%
Thermoplastic polyurethane	-	3%	14%
Viscose/ Modal[31]	-	2%	-
Wool	-	4%	-
Trims[32]	1%	2%	3%

The average final product weights presented in Table 43 and Table 44 correspond to the weight of the final product after raw materials acquisition and pre-processing, manufacturing and assembly. The sum of all raw material inputs needed per representative product are higher than the final product weight due to losses along the production and value chain. The input amount

[28] Totals per RP may not reach 100% due to rounding.
[29] Although data from the past years indicate an increased share of organic cotton on the European market (Textile Exchange, 2020b), the actual share of organic cotton in 2019 was 0.93% globally. Because of this very low share, organic cotton is included here in the cotton category.
[30] Other synthetics include aramid, copolyester, elastodiene, elastolefin, polyethylene.
[31] Because of the very similar production processes of viscose and modal these materials are grouped in the same category.
[32] Trims include buttons, hooks, tags, tapes, toe caps, shoe laces, zippers, zip pullers, as relevant for each subcategory. The assumed material composition of trims is an equal share of PES, PET and metal.

per functional unit is therefore calculated data and the quantities are determined according to residual losses during the production processes (See Section 6.2.2 for details)

ANNEX V – Detailed requirements regarding intrinsic quality

The specific requirements regarding intrinsic quality for the different types of products are defined in the following tables (Table 46 to Table 68).

The initial selection of intrinsic quality (durability) tests was taken from the Higg Product Module methodology (Link). This was developed by an international group of brands, manufacturers, and testing laboratories, and it combined brand and manufacturer quality testing requirements as well as discussion on common failure modes (supported by retailer return data and testing laboratory failure percentages). This methodology was further reviewed by the TS to align testing requirements with the RP sub-categories and simplify testing requirements. While these tests cannot be considered to be comprehensive of all possible failure modes, they represent a cross-section of quality tests that are performed by industry to validate product quality and durability.

In all cases where wash tests are used, care instructions for washing and drying shall be followed. Tumble drying shall be performed each cycle of 10 washes if used.

If a product claims to have an intentionally added performance attribute (such as water repellency, stain release, wrinkle resistance, odour management, wicking, etc), this shall form part of the intrinsic quality since the performance is a key attribute of the product's quality claims. When a product has a performance attribute claim, the existing tests are reduced in weight to include additional requirements to measure the performance claim. Any performance claim which cannot be quantified shall use the claims performance claim weighting, but receives 0 points for the claim itself. If a product has multiple performance claims, the total weighting for performance claims is split evenly between all claims.

For products made of several types of fabrics , the tests shall be conducted on a minimum of 80% of the materials by weight, including trims. Materials are defined as those required to be labelled separately as part of the Textile Labelling Act. Embroidery shall be considered a trim unless the

embroidery covers more than 10% of the total surface of the product. As failure of one material or trim (e.g. zipper) will imply failure of the entire product for the consumer, the worst result for material testing shall be used for the whole product.

For example, for a t-shirt (RP1) and colourfastness according to ISO 105 E04

- Material A – shade change ≥ Grade 3 -> 5 points
- Material B - shade change ≥ Grade 3-4 -> 10 points
- T-shirt. -> 5 points

The garment integrity tests shall be conducted as described below.

2343
2344 Table 45 Intentionally added functional property claims

Performance Claim	Test Standard	5 points (basic) 10x Wash	10 points (moderate) 30x Wash	15 points (aspirational) 60x Wash
Smoothness	ISO 5077 & 6330 (washing) or ISO 3175-2 & 3175-1 (dryclean) according to care label	Grade ≥4 after 5x cleaning cycles	Grade ≥4 after 10x cleaning cycles	Grade ≥3 - 4 after 15x cleaning cycles
Cold (thermal resistance)	ISO11092 RCT	Change claimed value ($K.m^2/W$)<10%	Change claimed value ($K.m^2/W$)<10%	Change claimed value ($K.m^2/W$)<10%
Water repellency	Bundesmann ISO 9865 OR	Rating of 4.5 or higher at 10 min	Rating between 2.5 included and 4.5 not included at 10 min	Rating below 2.5 not included at 10 min
	ISO 4920	≥ Grade 4 (laundered specimen)		
Soil or stain Release	AATCC 130, Washing Procedure selection to match care label	≥ Grade 4 (laundered specimen)		
Wrinkle resistance	ISO 9867	≥ Grade 4 (laundered specimen)		
Wicking	AATCC 197 (Option B, 30 minutes)	Measure performance “as received” (initial value). After wash, must achieve the HIGHER of 80% of initial value or 150 mm.		
Odor manage-ment	ISO 20743, Absorption Method	1-log reduction (90% reduction) in bacteria after 24-hour contact time compared to an untreated, unlaundered sample.		
Breathabili-ty (post-laundering)	*JIS L1099 ** ISO 11092	U-Urban wear, A-Active wear, M-Mountaineering wear Option 1* B1 & B2: U: ≥8000 & 5000, A: ≥12000 & 8000, M: ≥20000 & 10000. Option 2**, Ret: U: 13-20, A:6-13, M: ≤6		
Stretch and recovery	EN 14704-1	≥85% recovery after 30 min - Fabrics containing <5% elastane ≥90% recovery after 30 min - Fabrics containing ≥5% elastane		
Other	Relevant ISO standard	Measure performance “as received” (initial value). After wash, must keep 80% of initial value.		

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Table 46 Duration of service requirements for RP 1 (T-shirts)

Duration of Service Test and Rating		**% Weighting per test**	**Endurance Factors and Requirements**		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801	-	Report only for bursting strength testing		
Fabric Bursting	ISO 13938-2 OR ASTM D3786	13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment Integrity Test (whole garment after aging) ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	Cleaning cycles* x15 OR x10 if >50% animal fibres	Cleaning cycles* x30 OR x15 if >50% animal fibres	Cleaning cycles* x60 OR x25 if >50% animal fibres
Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 6330 care label cycles (If tumble dry then 10x wash/1 Dry) or ISO 3175 (dryclean) ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5% Shrinkage width ±5% if knitted Shrinkage width ±3% if woven		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Appearance	Visual Exam (Comprehensive) ISO 15487	30%	ISO Pilling grade replica ≥3 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

*Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2351 Table 47 Duration of service requirements for RP 2 (Shirts and blouses) – Woven

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (Perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven : 8% OR 5% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801	-	Report only for tensile/tear strength testing.		
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven : 7% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven : 7% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Woven : 7% OR 5%	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Seam slippage (Wovens only)	ISO 13936-2	Woven : 7% OR 5% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Fabric Tear Strength (Wovens only)	ISO 13937-1	Woven : 7% OR 5% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N >200gsm:≥ 16N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N >200gsm:≥ 17N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N >200gsm: ≥ 18N
Fabric Tensile Strength (Wovens only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven : 7% OR 5% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N)

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
			201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment Integrity Test (whole garment after aging) ISO 6330 (washing) or ISO 3175 (dryclean) according to care label		**50%**	**Cleaning cycles ** x15**	**Cleaning cycles ** X30**	**Cleaning cycles ** X60**
Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 6330 care label cycles (If tumble dry then 10x wash/1 Dry) or ISO 3175 (dryclean) ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5% Shrinkage width ±3%		
Appearance	Visual Exam (Comprehensive) ISO 15487	30%	ISO Pilling grade replica ≥3 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

*Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2354

Table 48 Duration of service requirements for RP 2 (Shirts and blouses) – Knitted

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (Perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted : 13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801	-	Report only for bursting strength testing.		
Fabric Bursting (knitted only)	ISO 13938-2 OR ASTM D3786	Knitted : 13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted : 8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted : 8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Knitted : 8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	• ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment Integrity Test (whole garment after aging) ISO 6330 (washing) or ISO 3175 (dryclean) according to care label		**50%**	**Cleaning cycles ** x15**	**Cleaning cycles ** X30**	**Cleaning cycles ** X60**
Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 6330 care label cycles (If tumble dry then 10x wash/1 Dry) or ISO 3175 (dryclean) ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5% Shrinkage width ±5%		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Appearance	Visual Exam (Comprehensive) ISO 15487	30%	ISO Pilling grade replica ≥3 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2355 *Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2356

Table 49 Duration of service requirements for RP 3 (Sweaters and midlayers)

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Fabric Bursting	ISO 13938-2 OR ASTM D3786	13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment Integrity Test (whole garment after aging ISO 6330 (washing) or ISO 3175 (dryclean) according to care label		**50%**	**Cleaning cycles ** x15**	**Cleaning cycles ** X20**	**Cleaning cycles ** X30**
Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 6330 care label cycles (If tumble dry then 10x wash/1 Dry) or ISO 3175 (dryclean) ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5% Shrinkage width ±5% if knitted Shrinkage width ±3% if woven		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Appearance	Visual Exam (Comprehensive) ISO 15487	30%	ISO Pilling grade replica ≥3 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2357 * Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2358 Table 50 Duration of service requirements for RP 4 (Jackets and coats) - Woven

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven:7% OR 5% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Martindale Abrasion Resistance (Wovens only)	ISO 12947-2	Woven:7% OR 5% if perf. claim	≤245 gsm :after the rupture of 2 yarns after 7'500 cycles 245 - 339 gsm : after the rupture of 2 yarns after 15'000 cycles >339 gsm : after the rupture of 2 yarns after 25'000 cycles	≤245 gsm :No rupture after 10'000 cycles 245 - 339 gsm :No rupture after 20 000 cycles >339 gsm :No rupture after 30'000 cycles	≤245 gsm :No rupture after 12'500 cycles 245 - 339 gsm :No rupture after 25 000 cycles >339 gsm :No rupture after 35'000 cycles
Density/Weight	EN 12127 / ISO 3801	-	Report only for tensile/tear strength testing.		
Fabric Tear Strength (Wovens only)	ISO 13937-1	Woven:6% OR 5% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N >200gsm:≥ 16N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N >200gsm:≥ 17N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N >200gsm: ≥ 18N

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Fabric Tensile Strength (Wovens only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N) 201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N) 201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N) 201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven:6% OR 4% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven:6% OR 4% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Woven:6% OR 4% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Seam slippage (Wovens only)	ISO 13936-2	Woven:6% OR 4% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per “Performance Claim” table	0% OR 15% if perf. claim	See “Performance Claim” table for requirement by claim type		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Garment integrity assessment on whole garment after appropriate cleaning cycles ** ISO 6330 (washing) or ISO 3175 (dryclean) according to care label		**50 %**	**Cleaning cycles* 5x OR 10x waterproof jackets**	**Cleaning cycles* 10x OR 30x waterproof jackets**	**Cleaning cycles* 15x OR 60x waterproof jackets**
Garment Dimensional Stability Shrinkage & Skew/ Twist /Torque	ISO 5077 & ISO 16322 Spirality	20% OR 10% If WP claim	Skewness ≤ 5%		
			Shrinkage width ±3%		
Product waterproofness (if claimed)	ISO 811	0% OR 10% if WP claim	≥2.6m & <20% Includes assessment of seams (no leaking at any seam, curve, or cross point)		
Fabric water repellence (if Claimed)	ISO 4920	0% OR 10% if WP claim	≥ 4		≥3-4
Appearance	Visual Examination ISO 15487	30% OR 20% if WP claim	No coating degradation or delamination of any membranes ISO Pilling grade replica ≥3-4 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2359 *Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2360

Table 51 Duration of service requirements for RP 4 (Jackets and coats) - Knitted

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted:13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Bursting Strength (Knitted only)	ISO 13938-2 OR ASTM D3786	Knitted:13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted:8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted:8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Knitted:8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Garment integrity assessment on whole garment after appropriate cleaning cycles ** ISO 6330 (washing) or ISO 3175 (dryclean) according to care label		**50 %**	**Cleaning cycles* 5x 10x waterproof jackets**	**Cleaning cycles* 10x 30x waterproof jackets**	**Cleaning cycles* 15x 60x waterproof jackets**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20% OR 10% If WP claim	Skewness ≤ 5%		
			Shrinkage width ±5%		
Product waterproofness (if claimed)	ISO 811	0% OR 10% if WP claim	≥2.6m & <20% Includes assessment of seams (no leaking at any seam, curve, or cross point)		
Fabric water repellence (if Claimed)	ISO 4920	0% OR 10% if WP claim	≥ 4		≥3-4
Appearance	Visual Examination ISO 15487	30% OR 20% if WP claim	No coating degradation or delamination of any membranes ISO Pilling grade replica ≥3-4 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

*Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2363 Table 52 Duration of service requirements for RP 4 (Jackets and coats) - Leather

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance Test (materials)		**50%**			
Tear strength (leather)	ISO 3376 (leather items)	Leather items: x%	> xN		
Tensile strength (leather)	ISO 3377-2 (leather)	Leather items: x%			
Colourfastness (leather)	ISO 105-D01 to dry cleaning	Leather items: x%	Change in colour: 4		
	ISO 11640 to dry rubbing	Leather items: x%	After 50 rubs: 3		
	ISO 11640 to wet rubbing	Leather items: x%	After 10 rubs: 2-3		

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Note	The thresholds for leather items will be defined at a later stage for RP 4 (Jackets and coats), RP5 (Pants and shorts), RP 6 (Dresses, skirts and jumpsuits), RP 7 (Leggings, stockings, tights and socks), RP 8 (Underwear), and RP10 (Accessories).

2365

2366 Table 53 Duration of service requirements for RP 5 (Pants and shorts) - Woven

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven:7% OR 5% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Martindale Abrasion Resistance (Wovens only)	ISO 12947-2	Woven:7% OR 5% if perf. claim	≤245 gsm :after the rupture of 2 yarns after 7'500 cycles 245 - 339 gsm : after the rupture of 2 yarns after 15'000 cycles >339 gsm : after the rupture of 2 yarns after 25'000 cycles	≤245 gsm : No rupture after 10'000 cycles 245 - 339 gsm : No rupture after 20'000 cycles >339 gsm : No rupture after 30'000 cycles	≤245 gsm : No rupture after 12'500 cycles 245 - 339 gsm : No rupture after 25'000 cycles >339 gsm : No rupture after 35'000 cycles
Seam slippage (Wovens only)	ISO 13936-2	Woven:6% OR 5% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Density/Weight	EN 12127 / ISO 3801		Report only for tensile/tear strength testing.		
Fabric Tear Strength (Wovens only)	ISO 13937-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N >200gsm:≥ 16N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N >200gsm:≥ 17N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N >200gsm: ≥ 18N

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Fabric Tensile Strength (Wovens only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N) 201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N) 201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N) 201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven:6% OR 4% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven:6% OR 4% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Woven:6% OR 4% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x30**	**Cleaning cycles* x60**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20% OR 10% If WP claim	Skewness ≤ 5% Shrinkage width ±3%		
Product waterproofness (if claimed)	ISO 811	0% OR 10% if WP claim	≥2.6m & <20% Includes assessment of seams (no leaking at any seam, curve, or cross point)		
Fabric water repellence (if Claimed)	ISO 4920	0% OR 10% if WP claim	≥ 4		≥3-4
Appearance	Visual Examination ISO 15487	30% OR 20% if WP claim	No coating degradation or delamination of any membranes ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

* Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2369 Table 54 Duration of service requirements for RP 5 (Pants and shorts) – Knitted

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted:13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Bursting Strength (Knitted fabrics only	ISO 13938-2 OR ASTM D3786	Knitted:13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted:8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted:8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Knitted:8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Garment integrity assessment on whole garment after appropriate cleaning cycles ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x30**	**Cleaning cycles* x60**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20% OR 10% If WP claim	Skewness ≤ 5%		
			Shrinkage width ±5%		
Product waterproofness (if claimed)	ISO 811	0% OR 10% if WP claim	≥2.6m & <20% Includes assessment of seams (no leaking at any seam, curve, or cross point)		
Fabric water repellence (if Claimed)	ISO 4920	0% OR 10% if WP claim	≥ 4		≥3-4
Appearance	Visual Examination ISO 15487	30% OR 20% if WP claim	No coating degradation or delamination of any membranes ISO Pilling grade replica ≥3-4 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

* Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2372 Table 55 Duration of service requirements for RP 6 (Dresses, skirts and jumpsuits) - Woven

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Performance (perf.) Test (materials)		50%			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven:7% OR 5% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Martindale Abrasion Resistance (Wovens only)	ISO 12947-2	Woven:7% OR 5% if perf. claim	≤245 gsm :after the rupture of 2 yarns after 7'500 cycles 245 - 339 gsm : after the rupture of 2 yarns after 15'000 cycles >339 gsm : after the rupture of 2 yarns after 25'000 cycles	245 gsm : No rupture after 10'000 cycles 245 - 339 gsm : No rupture after 20'000 cycles >339 gsm : No rupture after 30'000 cycles	≤245 gsm : No rupture after 12'500 cycles 245 - 339 gsm : No rupture after 25'000 cycles >339 gsm : No rupture after 35'000 cycles
Seam slippage (Wovens only)	ISO 13936-2	Woven:6% OR 5% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Density/Weight	EN 12127 / ISO 3801		Report only for tensile/tear strength testing.		
Fabric Tear Strength (Wovens only)	ISO 13937-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N >200gsm:≥ 16N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N >200gsm:≥ 17N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N >200gsm: ≥ 18N

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Fabric Tensile Strength (Wovens only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N) 201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N) 201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N) 201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven:6% OR 4% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven:6% OR 4% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Woven:6% OR 4% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Garment integrity assessment on whole garment after appropriate cleaning cycles * ISO 6330 (washing) or ISO 3175 (dryclean) according to care label		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x30**	**Cleaning cycles* x60**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5%		
			Shrinkage width ±3%		
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2373 *Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2374 Table 56 Duration of service requirements for RP 6 (Dresses, skirts and jumpsuits) - Knitted

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted:13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Bursting Strength (Knitted fabrics only	ISO 13938-2 OR ASTM D3786	Knitted:13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted:8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted:8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Knitted:8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles * ISO 6330 (washing) or ISO 3175 (dryclean) according to care label		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x30**	**Cleaning cycles* x60**
Garment Dimensional		20%	Skewness ≤ 5%		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality		Shrinkage width ±3%		
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

*Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2380 Table 57 Duration of service requirements for RP 7 (Leggings, stockings, tights and socks) - Woven

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven:7% OR 5% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Martindale Abrasion Resistance (Wovens only)	ISO 12947-2	Woven:7% OR 5% if perf. claim	≤245 gsm :after the rupture of 2 yarns after 7'500 cycles 245 - 339 gsm : after the rupture of 2 yarns after 15'000 cycles >339 gsm : after the rupture of 2 yarns after 25'000 cycles	245 gsm : No rupture after 10'000 cycles 245 - 339 gsm : No rupture after 20'000 cycles >339 gsm : No rupture after 30'000 cycles	≤245 gsm : No rupture after 12'500 cycles 245 - 339 gsm : No rupture after 25'000 cycles >339 gsm : No rupture after 35'000 cycles
Seam slippage (Wovens only)	ISO 13936-2	Woven:6% OR 5% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Density/Weight	EN 12127 / ISO 3801		Report only for tensile/tear strength testing.		
Fabric Tear Strength (Woven fabrics only)	ISO 13937-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N >200gsm:≥ 16N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N >200gsm:≥ 17N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N >200gsm: ≥ 18N

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Fabric Tensile Strength (Wovens only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N) 201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N) 201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N) 201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven:6% OR 4% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven:6% OR 4% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Woven:6% OR 4% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles *. ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x20**	**Cleaning cycles* x30**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5%		
			Shrinkage width ±3%		
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2381 * Cleaning cycles based on a combination of accelerated aging and frequency of washing.

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2384 Table 58 Duration of service requirements for RP 7 (Leggings, stockings, tights and socks) - Knitted

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted:13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Bursting Strength (Knitted fabrics only	ISO 13938-2 OR ASTM D3786	Knitted:13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted:8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted:8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Knitted:8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles *. ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x20**	**Cleaning cycles* x30**
Garment Dimensional		20%	Skewness ≤ 5%		

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality		Shrinkage width ±5%		
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2385 * Cleaning cycles based on a combination of accelerated aging and frequency of washing.

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2387

2388 Table 59 Duration of service requirements for RP 8 (Underwear) - Woven

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven:8% OR 5% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Martindale Abrasion Resistance (Wovens only)	ISO 12947-2	Woven:7% OR 5% if perf. claim	≤245 gsm :after the rupture of 2 yarns after 7'500 cycles 245 - 339 gsm : after the rupture of 2 yarns after 15'000 cycles >339 gsm : after the rupture of 2 yarns after 25'000 cycles	245 gsm : No rupture after 10'000 cycles 245 - 339 gsm : No rupture after 20'000 cycles >339 gsm : No rupture after 30'000 cycles	≤245 gsm : No rupture after 12'500 cycles 245 - 339 gsm : No rupture after 25'000 cycles >339 gsm : No rupture after 35'000 cycles
Seam slippage (Wovens only)	ISO 13936-2	Woven:7% OR 5% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Density/Weight	EN 12127 / ISO 3801		Report only for tensile/tear strength testing.		
Fabric Tear Strength (Woven fabrics only)	ISO 13937-1 (Values in brackets represent animal fibre products)	Woven:7% OR 5% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N >200gsm:≥ 16N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N >200gsm:≥ 17N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N >200gsm: ≥ 18N

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Fabric Tensile Strength (Wovens only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven:7% OR 5% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N) 201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N) 201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N) 201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven:7% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven:7% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per “Performance Claim” table	0% OR 15% if perf. claim	See “Performance Claim” table for requirement by claim type		

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Garment integrity assessment on whole garment after appropriate cleaning cycles *. ISO 6330 (washing) or ISO 3175 (dryclean) according to care label**.**		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x20**	**Cleaning cycles* x30**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5%		
			Shrinkage width ±3%		
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2389 * Cleaning cycles based on a combination of accelerated aging and frequency of washing.

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Table 60 Duration of service requirements for RP 8 (Underwear) - Knitted

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted:15% OR 11% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Bursting Strength (Knitted fabrics only	ISO 13938-2 OR ASTM D3786	Knitted:15% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted:10% OR 7% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted:10% OR 7% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles *. ISO 6330 (washing) or ISO 3175 (dryclean) according to care label**.**		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x20**	**Cleaning cycles* x30**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5%		
			Shrinkage width ±5%		

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2393 * Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2394 Table 61 Duration of service requirements for RP 9 (Swimwear) - Woven

Note	This table is a repetition of the requirements for RP5 with additional requirements for colourfastness in chlorinated / salted water, for which thresholds must be defined.

2395

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven:6% OR 4% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Martindale Abrasion Resistance (Wovens only)	ISO 12947-2	Woven:6% OR 4% if perf. claim	≤245 gsm :after the rupture of 2 yarns after 7'500 cycles 245 - 339 gsm : after the rupture of 2 yarns after 15'000 cycles >339 gsm : after the rupture of 2 yarns after 25'000 cycles	245 gsm : No rupture after 10'000 cycles 245 - 339 gsm : No rupture after 20'000 cycles >339 gsm : No rupture after 30'000 cycles	≤245 gsm : No rupture after 12'500 cycles 245 - 339 gsm : No rupture after 25'000 cycles >339 gsm : No rupture after 35'000 cycles
Seam slippage (Wovens only)	ISO 13936-2	Woven:6% OR 4% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Density/Weight	EN 12127 / ISO 3801		Report only for tensile/tear strength testing.		
Fabric Tear Strength (Wovens only)	ISO 13937-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
			>200gsm:≥ 16N	>200gsm:≥ 17N	>200gsm: ≥ 18N
Fabric Tensile Strength (Woven fabrics only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N) 201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N) 201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N) 201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven:5% OR 4% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven:5% OR 3% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Woven:5% OR 4% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
	Colour fastness (chlorinated / salt water)	Woven:5% OR 4% if perf. claim			

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles *. ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x20**	**Cleaning cycles* x30**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5% Shrinkage width ±3%		
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2396 * Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2397 Table 62 Duration of service requirements for RP 9 (Swimwear) - Knitted

Note	This table is a repetition of the requirements for RP5 with additional requirements for colourfastness in chlorinated / salted water, for which thresholds must be defined.

2398

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted:13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Bursting Strength (Knitted fabrics only	ISO 13938-2 OR ASTM D3786	Knitted:13% OR 9% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted:6% OR 4% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted:6% OR 4% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Knitted:6% OR 4% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
	Colour fastness (chlorinated / salt water)	Knitted:6% OR 4% if perf. claim			

Duration of Service Test and Rating		% Weightingper test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles *. ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x20**	**Cleaning cycles* x30**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20%	Skewness ≤ 5%		
			Shrinkage width ±5%		
Appearance	Visual Examination ISO 15487	30%	ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2399 * Cleaning cycles based on a combination of accelerated aging and frequency of washing.

2400 Table 63 Duration of service requirements for RP 10 (Apparel accessories) - Woven

Note	This table is a repetition of the requirements for RP5 - woven

2401

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Woven:7% OR 5% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Martindale Abrasion Resistance (Wovens only)	ISO 12947-2	Woven:7% OR 5% if perf. claim	≤245 gsm :after the rupture of 2 yarns after 7'500 cycles 245 - 339 gsm : after the rupture of 2 yarns after 15'000 cycles >339 gsm : after the rupture of 2 yarns after 25'000 cycles	245 gsm : No rupture after 10'000 cycles 245 - 339 gsm : No rupture after 20'000 cycles >339 gsm : No rupture after 30'000 cycles	≤245 gsm : No rupture after 12'500 cycles 245 - 339 gsm : No rupture after 25'000 cycles >339 gsm : No rupture after 35'000 cycles
Seam slippage (Wovens only)	ISO 13936-2	Woven:6% OR 5% if perf. claim	<220gsm ≤6mm @ 60N ≥220gsm ≤6mm @ 120N	<220gsm ≤4mm @ 60N ≥220gsm ≤4mm @ 120N	<220gsm ≤2mm @ 60N ≥220gsm ≤2mm @ 120N
Density/Weight	EN 12127 / ISO 3801		Report only for tensile/tear strength testing.		
Fabric Tear Strength (Wovens only)	ISO 13937-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<70gsm:≥ 8N 70 - 120 gsm:≥ 10N 121 - 200 gsm:≥12N	<70gsm: ≥ 9N 70 - 120 gsm: ≥ 11N 121 - 200 gsm:≥13N	<70gsm: ≥ 10N 70 - 120 gsm: ≥ 12N 121 - 200 gsm:≥14N

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
			>200gsm:≥ 16N	>200gsm:≥ 17N	>200gsm: ≥ 18N
Fabric Tensile Strength (Wovens only)	ISO 13934-1 (Values in brackets represent animal fibre products)	Woven:6% OR 4% if perf. claim	<150 gsm: Warp ≥ 220N , (100N) Weft ≥110N (70N) 151 - 200gsm: Warp ≥290N (125N) Weft≥ 130N (80N) 201 -300 gsm: Warp ≥360N, (150N) Weft ≥180N (100N) 301 - 400gsm: Warp =>400N, (200N) Weft 220N (150N) >400gsm: Warp ≥ 490N, (250N) Weft 290N (190N)	<150 gsm: Warp ≥ 270N , (125N) Weft ≥160N (85N) 151 - 200gsm: Warp ≥330N (150N) Weft≥ 180N (100N) 201 -300 gsm: Warp ≥400N, (200N) Weft ≥220N (125N) 301 - 440gsm: Warp =>400N, (250N) Weft 270N (200N) >400gsm: Warp ≥ 530N, (300N) Weft 330N (220N)	<150 gsm: Warp ≥ 310N (145N) Weft ≥200N (100N) 151 - 200gsm: Warp ≥380N (170N) Weft≥ 220N (115N) 201 -300 gsm: Warp ≥440N, (230N) Weft ≥270N (175N) 301 - 440gsm: Warp =>490N, (290N) Weft 310N (230N) >400gsm: Warp ≥ 580N, (380N) Weft 380N (250N)
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Woven:6% OR 4% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Woven:6% OR 4% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Woven:6% OR 4% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	Test Standard		5 points (basic)	10 points (moderate)	15 points (aspirational)
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		
Garment integrity assessment on whole garment after appropriate cleaning cycles ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x30**	**Cleaning cycles* x60**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20% OR 10% If WP claim	Skewness ≤ 5% Shrinkage width ±3%		
Product waterproofness (if claimed)	ISO 811	0% OR 10% if WP claim	≥2.6m & <20% Includes assessment of seams (no leaking at any seam, curve, or cross point)		
Fabric water repellence (if Claimed)	ISO 4920	0% OR 10% if WP claim	≥ 4		≥3-4
Appearance	Visual Examination ISO 15487	30% OR 20% if WP claim	No coating degradation or delamination of any membranes ISO Pilling grade replica ≥3-4 No component failure (eg buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2402

2403 Table 64 - Duration of service requirements for RP 10 (Apparel accessories) – Knitted

Note	This table is a repetition of the requirements for RP5 - knitted

2404

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Performance (perf.) Test (materials)		**50%**			
Pilling Resistance	ISO 12945-1 (Pilling box method) with assessment by ISO Pilling Grade replicas	Knitted:13% OR 10% if perf. claim	Smooth surface ≥Grade 3 Products with raised surface ≥ 2-3 5'400 cycles (90min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 7'200 cycles (120 min)	Smooth surface ≥Grade 3-4 Products with raised surface ≥ 3 10'800 cycles (180 min)
Density/Weight	EN 12127 / ISO 3801		Report only for bursting strength testing.		
Bursting Strength (Knitted fabrics only	ISO 13938-2 OR ASTM D3786	Knitted:13% OR 10% if perf. claim	≤ 180gsm ≥ 251 kPa >180gsm ≥ 320 kPa	≤ 180gsm ≥ 279 kPa >180gsm ≥ 360 kPa	≤ 180gsm ≥ 310 kPa >180gsm ≥ 400 kPa
Fabric Colourfastness	ISO 105 X12 OR AATCC 8 (to crocking) wet rub	Knitted:8% OR 5% if perf. claim	Grade ≥3 using ISO / AATCC greyscale for colour change	Grade ≥3-4 using ISO / AATCC greyscale for colour change	Grade ≥4 using ISO / AATCC greyscale for colour change
	ISO 105 E04 OR AATCC 15 (to perspiration)	Knitted:8% OR 5% if perf. claim	Shade change ≥Grade 3	Shade change ≥Grade 3-4	Shade change ≥Grade 4
	ISO 105-B02, X hours of light exposure OR AATCC 16, Op3, 20 AFU (to light)	Knitted:8% OR 5% if perf. claim	Blue Reference ≥Grade 4 48 hours of light exposure	Blue Reference ≥Grade 4 96 hours of light exposure	Blue Reference ≥Grade 4 144 hours of light exposure
Performance Claim	ISO 6330 4N wash/dry conditions based on care instructions. If tumble dry, use 10 wash / 1 dry, plus evaluation standard as per "Performance Claim" table	0% OR 15% if perf. claim	See "Performance Claim" table for requirement by claim type		

Duration of Service Test and Rating		% Weighting per test	Endurance Factors and Requirements		
Test Item	**Test Standard**		**5 points (basic)**	**10 points (moderate)**	**15 points (aspirational)**
Garment integrity assessment on whole garment after appropriate cleaning cycles ISO 6330 (washing) or ISO 3175 (dryclean) according to care label.		**50%**	**Cleaning cycles* x15**	**Cleaning cycle* x30**	**Cleaning cycles* x60**
Garment Dimensional Stability Shrinkage & Skew/Twist/Torque	ISO 5077 & ISO 16322 Spirality	20% OR 10% If WP claim	Skewness ≤ 5% Shrinkage width ±5%		
Product waterproofness (if claimed)	ISO 811	0% OR 10% if WP claim	≥2.6m & <20% Includes assessment of seams (no leaking at any seam, curve, or cross point)		
Fabric water repellence (if Claimed)	ISO 4920	0% OR 10% if WP claim	≥ 4		≥3-4
Appearance	Visual Examination ISO 15487	30% OR 20% if WP claim	No coating degradation or delamination of any membranes ISO Pilling grade replica ≥3-4 No component failure (e.g. buttons or zippers) ISO Greyscale Colour change Grade ≥4 No broken seams		

2405

2406

Table 65 Duration of service requirements for RP 11 (Open-toed shoes)

Test Item	Test Standard	% Weighting of Failure Mode	Endurance Factors and Requirements		
			5 points - basic	10 points - moderate	15 points - aspirational
Product Integrity			30,000 forefoot flex cycles	40,000 forefoot flex cycles	50,000 forefoot flex cycles
Cracking	Whole Shoe Flex test – Visual ISO 24266 30 degrees +/- 1 degrees 140 +/- 10 cycles per minute	25%	No cracking of the upper, midsole or outsole		
Delamination			No peeling or seam separation of the upper No delamination between any component		
Bonding strength	EN ISO 17708 [daN/cm] or [N/mm]	25%	≥ 3 (no outsole or upper material delamination or breakage) ≥ 2,5 (if outsole or upper material delamination or breakage)	≥ 4 (no outsole or upper material delamination or breakage) ≥ 3,5 (if outsole or upper material delamination or breakage)	≥ 5 (no outsole or upper material delamination or breakage) ≥ 4,5 (if outsole or upper material delamination or breakage)
Material level test					
Outsole abrasion resistance	ISO 20871:2018	25%	If density ≥ 0.9 g/cm3, then ≤ 200 mm3 If density < 0.9 g/cm3 , then ≤ 150 mg		
Determination of tear strength for upper materials	EN 13571 ISO 17696	12.5%	40	60	80
Martindale abrasion resistance (Lining & insock)	ISO 17704	12.5%	25’600 cycles dry (no worse than moderate abrasion and holes through the material surface)	25’600 cycles dry (no worse than surface abraded but no holes through the material)	25’600 cycles dry (no damage, no change)

2407

2408 Table 66 Duration of service requirements for RP 12 (Closed-toed shoes), casual and fashion footwear

Test Item	Test Standard	% Weighting of Failure Mode	Endurance Factors and Requirements		
			5 points - basic	10 points - moderate	15 points - aspirational
Product Integrity			30,000 forefoot flex cycles	40,000 forefoot flex cycles	50,000 forefoot flex cycles
Cracking	Whole Shoe Flex test – Visual ISO 24266 30 degrees +/- 1 degrees 140 +/- 10 cycles per minute	25%	No cracking of the upper, midsole or outsole		
Delamination			No peeling or seam separation of the upper No delamination between any component		
Bonding strength	EN ISO 17708 [daN/cm] or [N/mm]	25%	≥ 3,5 (no outsole or upper material delamination or breakage) ≥ 3 (if outsole or upper material delamination or breakage)	≥ 4,5 (no outsole or upper material delamination or breakage) ≥ 4 (if outsole or upper material delamination or breakage)	≥ 5,5 (no outsole or upper material delamination or breakage) ≥ 5 (if outsole or upper material delamination or breakage)
Material level test					
Outsole abrasion resistance	ISO 20871:2018	25%	if density ≥ 0,9 g/mm3, then ≤ 250 mm3 if density < 0,9 g/mm3, then ≤ 170 mg		
Martindale abrasion resistance (Lining & insock)	ISO 17704	25%	25'600 cycles dry (no worse than moderate abrasion and holes through the material surface)	25'600 cycles dry (no worse than surface abraded but no holes through the material)	25'600 cycles dry (no damage, no change)

2409

2410 Table 67 Duration of service requirements for RP 12 (Closed-toed shoes), athletic footwear

Test Item	Test Standard	% Weighting of Failure Mode	Endurance Factors and Requirements		
			5 points - basic	10 points - moderate	15 points - aspirational
Product Integrity			50,000 forefoot flex cycles	60,000 forefoot flex cycles	70,000 forefoot flex cycles
Cracking	Whole Shoe Flex test – Visual ISO 24266 30 degrees +/- 1 degrees 140 +/- 10 cycles per minute	25%	No cracking of the upper, midsole or outsole		
Delamination			No peeling or seam separation of the upper No delamination between any component		
Bonding strength	EN ISO 17708 [daN/cm] or [N/mm]	25%	≥ 4 (no outsole or upper material delamination or breakage) ≥ 3,5 (if outsole or upper material delamination or breakage)	≥ 5 (no outsole or upper material delamination or breakage) ≥ 4,5 (if outsole or upper material delamination or breakage)	≥ 6 (no outsole or upper material delamination or breakage) ≥ 5,5 (if outsole or upper material delamination or breakage)
Material level test					
Outsole abrasion resistance	ISO 20871:2018	25%	if density ≥ 0,9 g/mm3, then ≤ 200 mm3 if density < 0,9 g/mm3, then ≤ 150 mg		
Martindale abrasion resistance (Lining & insock)	ISO 17704	25%	51’200 cycles dry (no worse than moderate abrasion and holes through the material surface)	51’200 cycles dry (no worse than surface abraded but no holes through the material)	51’200 cycles dry (no damage, no change)

2411

2412 Table 68 Duration of service requirements for RP 13 (Boots)

Test Item	Test Standard	% Weighting of Failure Mode	Endurance Factors and Requirements		
			5 points - basic	10 points - moderate	15 points - aspirational
Product Integrity			30,000 forefoot flex cycles	40,000 forefoot flex cycles	50,000 forefoot flex cycles
Cracking	Whole Shoe Flex test – Visual ISO 24266 30 degrees +/- 1 degrees 140 +/- 10 cycles per minute	25%	No cracking of the midsole or outsole		
Delamination			No peeling or seam separation of the upper No delamination between any component		
Bonding strength	EN ISO 17708 [daN/cm] or [N/mm]	25%	3	4	5
Material level test					
Outsole abrasion resistance	ISO 20871:2018	12.5% (if the boot has a zipper) 25% (no zipper)	If density ≥ 0.9 g/cm3, then ≤ 200 mm3 If density < 0.9 g/cm3 , then ≤ 150 mg		
Determination of tear strength for upper materials	EN 13571 ISO 17696	12.5%	40	60	80
Martindale abrasion resistance (Lining & insock)	ISO 17704	12.5%	51’200 cycles dry (no worse than moderate abrasion and holes through the material surface)	51’200 cycles dry (no worse than surface abraded but no holes through the material)	51’200 cycles dry (no damage, no change)
Zipper reciprocation	EN 16732	12.5% (if zipper)	500N	750N	1000N

2413

ANNEX VI – Detailed requirements regarding repairability

Table 69 Repairability requirements for RP 1 (T-shirts)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Broken Seam					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							

Table 70 Repairability requirements for RP 2 (Shirts and blouses)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Buttons					50		*200*
Snaps					*50*		*200*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							
Total Product Repairability % achieved – OPS/MPS*100							

2421 Table 71 Repairability requirements for RP 3 (Sweaters and midlayers)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Zipper					50		*200*
Buttons					25		*100*
Snaps					*25*		*100*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							
Total Product Repairability % achieved – OPS/MPS*100							

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2424 Table 72 Repairability requirements for RP 4 (Jackets and coats)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Zipper					50		*200*
Seam Tape					15		*60*
Glued Pockets					*25*		*100*
Buttons					*5*		*20*
Snaps					*5*		*20*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							
Total Product Repairability % achieved – OPS/MPS*100							

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Table 73 Repairability requirements for RP 5 (Pants and shorts)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Zipper					50		*200*
Buttons					*25*		*100*
Snaps					*25*		*100*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							
Total Product Repairability % achieved – OPS/MPS*100							

Table 74 Repairability requirements for RP 6 (Dresses, skirts and jumpsuits)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Zipper					50		*200*
Buttons					*25*		*100*
Snaps					*25*		*100*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							
Total Product Repairability % achieved – OPS/MPS*100							

Table 75 Repairability requirements for RP 7 (Leggings, stockings, tights and socks)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Broken Seam					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							

Table 76 Repairability requirements for RP 8 (Underwear)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yr – 0.25		= (D+S+P+W)*RW	
Buttons					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							

Table 77 Repairability requirements for RP 9 (Swimwear)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yr – 0.25		= (D+S+P+W)*RW	
Broken Seam					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							

Table 78 Repairability requirements for RP 10 (Apparel accessories)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yr – 0.25		= (D+S+P+W)*RW	
Broken Seam					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							

Table 79 Repairability requirements for RP 11 (Open-toed shoes)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yr – 0.25		= (D+S+P+W)*RW	
Outsole replacement					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							

Table 80 Repairability requirements for RP 12 (Closed-toed shoes)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yr – 0.25		= (D+S+P+W)*RW	
Outsole replacement					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							

Table 81 Repairability requirements for RP 13 (Boots)

Product Failure Mode	Repair documentation (D)	Repair Services (S) offered	Price of Repair (P)	Repair Warranty Period (W)	Relative Weight of Failure (RW)	Failure Mode Reparability Score	Max Failure Mode score
Points	Detailed – 1 Generic – 0.5 Not available - 0	Yes – 1 No - 0	P = Free – 1 No service or for a fee - 0	W ≥ 10 yrs – 1 5 ≤ W < 10 yrs – 0.5 W < 5 yrs – 0.25		= (D+S+P+W)*RW	
Outsole replacement					100		*400*
Overall Product Score (OPS) – Sum of Failure Mode repairability scores for the product							
Maximum Product Score (MPS) – Sum of **applicable** Max Failure Mode Scores for the product							*400*
Total Product Repairability % achieved – OPS/MPS*100							