ISO/TC 221/WG 6 "Design using geosynthetics"
Convenorship: **BSI**
Convenor: **Smith Derek Mr**

ISO TC221 WG6 N404 Notice_of_meeting_draft_agenda_19th Nov 2024

Document type	Related content	Document date	Expected action
Meeting / Agenda	Meeting: Taian (China) 19 Nov 2024	2024-10-25	

Description

Minor update to agenda

International Organization for Standardization
Organisation internationale de normalisation
Международная организация по стандартизации

NOTICE OF MEETING / DRAFT AGENDA

Date 2024-07-17	**Reference** ISO/TC 221 WG 6 **N 404**
Number and title of TC/*Numéro et titre du TC* ISO TC221 WG6 Design Using Geosynthetics	
Secretariat/*Secrétariat* BSI	**Meeting/*Réunion*** Meeting dates / *Dates de la réunion*: 19th November 2024 14:00 to 18:00 Tai'an time (UTC + 8hrs)
Host/*Invitant* Derek Smith Derek.smith@coffey.com	**Place/*Lieu*** Address/*Adresse*: Room details to be confirmed, but building to be Ramada Plaza Taian No.16, Yingsheng East Road Taian Taian Shandong China 271000 Zoom electronic virtual meeting details to be confirmed. Tel: Click here to enter text.

The draft agenda for the WG6 meeting will be as below. The agenda will likely be updated prior to the meeting taking place. Details will be circulated in due course.

1. Welcome
2. Roll call of delegates
3. Adoption of agenda (N403)
4. Code of Conduct
5. Approval of Draft Meeting Report of 24th October 2023 Ankara (N392)
6. Approval of Draft Meeting Report of 3rd May 2024 Missisauga (N396)
7. Report on status of Project Group Reports
8. Review of comments on TR 18228-5 (N402, N403)
9. Work Item scope definition regarding sustainability aspects
10. Confirmation of deliverables
11. Future Meetings
12. Any Other Business
13. Closure

Any comments on the agenda should be forwarded to the Convener at least 2 weeks prior to the meeting.

ISO/TC 221/WG 6 **N 403**

ISO/TC 221/WG 6 "Design using geosynthetics"
Convenorship: **BSI**
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ISO_DTR 18228-5 Collated Comments

Document type	Related content	Document date	Expected action
Project / Other		2024-10-25	

Description

This is a copy of the comments received on the final document circulated for internal ballot (N401). These comments will be discussed during the WG6 meeting in China.

Template for comments and secretariat observations

Date:2024-09-10	Document:	Project:

MB/ NC[1]	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment[2]	Comments	Proposed change	Observations of the secretariat
USA-001			Figure 3b	Te	To differentiate between the 2-D geosynthetic and the 3-D geocell, the-improved zone in Fig. 3b should show a small zone where the angle bends like in Fig. 3c, but to a less extent since it only reaches into the granular layer a little bit. It should also show the dashed resultant angle, which will be less improvement when compared to the geocell.		
FT/IT-002		4.1		ge	Where high levels of strain are anticipated, the tension membrane effect (reinforcement) will be dominant	Change with: Where high levels of strain are anticipated, the reinforcement function will be dominant	
USA-003		4.1	1	te	Stabilization should be differentiated between subgrade and the base course layer. When the subgrade is stabilized, the tensioned membrane is the most common form of restraint or benefit. When the base course is stabilized, confinement is the most common form of restraint.	Suggest differentiating more clearly the two mechanisms based on the strength of the subgrade. For stiffer foundations, the confinement of the base course is the predominant mechanism for improvement. For softer subgrades, tensioned membrane becomes more predominant. The way it is currently written does not clearly differentiate this, confusing the designer as to which mechanism is predominant for a given set of field conditions. The word stabilization is a good word for both mechanisms, but should be clarified based on what is being stabilized.	
USA-004		4.1	1	te	There are more than two primary mechanisms: i.e.drainage and separation	There are several mechanisms…..	
USA-005		4.1	3	te	Interlock is not part of the friction mechanism	Delete “interlock”	
FT/IT-006		4.1	Figure 1	ge	in Figure 1 the geosynthetic is shown with a pattern (n.3). this is not a clear and it does not represent of all the type of geosynthetic for stabilization but is a patter that call to mind only a	a more clear picture shall be added to clearly take into consideration also other type of reinforcement (example in the below picture)	

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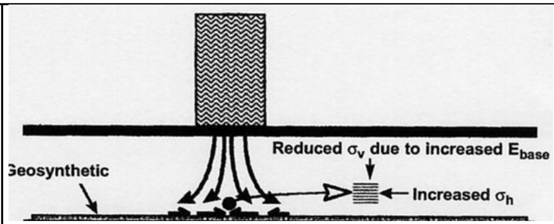
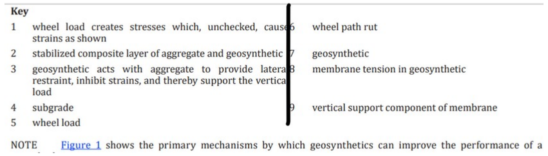
MB/ NC[1]	Line number	Clause/ Subclause	Paragraph/ Figure/Table	Type of comment[2]	Comments	Proposed change	Observations of the secretariat
					specific type of Geosynthetic (that is a geocells) while is not representative for other type of geosynthetic such as a geogrid.		
FT/IT-007		4.1	Figure 1 - Key	ed	Text and numbers are almost overlapped	Keep some space between text and numbers for a better reading.  Key 1 wheel load creates stresses which, unchecked, cause strains as shown 2 stabilized composite layer of aggregate and geosynthetic 3 geosynthetic acts with aggregate to provide lateral restraint, inhibit strains, and thereby support the vertical load 4 subgrade 5 wheel load 6 wheel path rut 7 geosynthetic 8 membrane tension in geosynthetic 9 vertical support component of membrane NOTE Figure 1 shows the primary mechanisms by which geosynthetics can improve the performance of a	
LU-008	1	4.1	Key of Figure 1	ed	Key points numbers (6-9 on right side are too close to the text on the left side (1-5)	Create a bigger distance between left column key points and right column of the key points	
USA-009		4.2	2	te	“the surface resilient” – “surface” is not necessary.	Delete “surface”	
USA -010		4.3.1	2	Te	The geosynthetic can be within or beneath the base layer.	Confinement is the dominant stabilization mechanism at low levels of strain (typically less than 1 %, but possibly up to 2 %) of the geosynthetic within or beneath the aggregate layer, depending also on the importance of the stabilized system (e.g. highway versus haul road) and the position of the geosynthetic within the stabilized system (usually at lower levels higher strains are acceptable). If strain values are expected to be…	
AT-011		4.3.1	Fig. 2	te	Figure 2 shown on page 5 is technically not clear. It says that geotextiles are just working on the interaction by direct shear. This would therefore also include all wovens, where we see clearly that	Include GCO in B) Interaction by direct shear and / or interlocking;	

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Template for comments and secretariat observations

Date:2024-09-10	Document:	Project:

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					the roughness of the surface shows increased interaction. This mechanism shall be seen partly as direct shear but also particles INTERLOCK in the structure of the woven. This mechanism in the figure b) is just for geogrids – which is WRONG. What about geocomposites beside the wovens with a rough surface structure? Having said that I see a mismatch in the nomenclature of EN ISO 10318. Geocomposites are totally out of stabilization with that figure on page 13. Wovens are not seen in their full capabilities.	Include GTX-W in B) Interaction by direct shear and / or interlocking;	
-012		4.3.1.	FIGURE 2	te	Geocomposites GCO are totally out of figure 2 on page 5.	Include GCO in B) Interaction by direct shear and / or interlocking; or keep only the description of phenomenon without mentioning product or technology	
-013		4.3.1.	FIGURE 2	te	Woven geotextiles GTX-W are not seen here in their full capabilities as the roughness of the surface shows increased interaction.	Include GTX-W in B) Interaction by direct shear and / or interlocking; or keep only the description of phenomenon without mentioning product or technology	
-014		4.3.1.	FIGURE 2, b)	te	Generally, interaction by direct shear is less efficient with Geogrid as the Interlocking could be less efficient with geotextile. Geocomposite also could provide both with less or better performances. Anyhow, direct shear and interlocking do not depend only on the technology but also on the product performances (stiffness, surface roughness, aperture size, junctions…).	The type of the product or technology (geogris, geotextile…) should not be mentioned in these figures. We should keep only the description of phenomenon (direct shear and interlocking). Otherwise, we should add all technologies and exclude or promote no one.	
USA-015		4.3.2	1	te	geosynthetic with aggregate in a compacted granular layer	geosynthetic with aggregate in or underneath a compacted granular layer	
USA-016		4.3.2	2	Te	The stiffness provided by the geosynthetic reduces development of lateral tensile strain and stress (aggregate cannot carry tensile stress)	The stiffness provided by the geosynthetic reduces development of lateral deformation	

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USA-017		4.3.2	2	Ed	The shear resistance caused by friction and mechanical interlock generates a physical restraint ("physical" unclear)	The shear resistance caused by friction and mechanical interlock generates a lateral restraint	
USA-018		4.3.2	4	Ed	thickness of the confined and transition zones varies with different geosynthetic and soil types	thickness of the confined and transition zones vary with different geosynthetic and soil types	
USA-019		4.3.2	Figure 2 c)	Te	Geocell is not mentioned in sections above	Needs to be mentioned before Figure	
-020		4.3.2.	First paragraph, last sentence.	te	The penetration by deformation and the imprint of the aggregate on the product could occur with geotextile and geocomposite products and lead to interlocking. The interlocking efficiency depend mainly on the product performances (stiffness, surface roughness, aperture size, junctions…), not only on the technology.	Delete or correct the last sentence (last sentence of first paragraph).	
USA-021		4.3.3		te	External Confinement - "external" is NOT an appropriate word here. Soil inside geocell is still internally confined	Suggest this as "Full confinement" and the above one as "Partial confinement"; alternatively, "3D confinement" and "2D confinement as mentioned later.	
USA-022		4.3.3	3	ed	…of the applied load, type of infill material, and the foundation characteristics.	…of the applied load, type and properties of infill material, and the foundation characteristics.	
USA-023		4.4	1	te	horizontal force component (i.e. shear stress) – Horizontal force and shear stress are not the same	Delete "shear stress"	
USA-024		4.4	3	te	both interaction mechanisms, friction or interlocking	There are three mechanisms here: friction on geotextile, interlocking with geogrid, and closed confinement by geocell.	
-025		4.4	Second paragraph		Idem, see comment above	Idem, see comment above	

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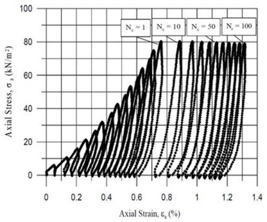
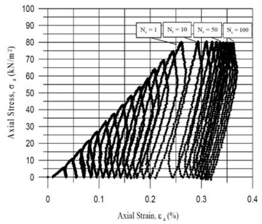
TR-026		4.5		Te	The reduction of shear strength does not occur due to the cyclic loading alone. The reduction of shear strength occurs mostly due to the rotation of the principal axis, which takes place because of the approaching vehicle reaching to the point of interest and then moving away. This fact has been demonstrated by many researchers. Dareeju et al (2015)[1] clearly demonstrates the effect of rotating principal axis, as shown in the below graphics.  *σ_a-ε_a relationships for cyclic moving wheel MRS test*  *σ_a-ε_a relationships for cyclic single point MRS test* Also the study by Kim and Tutumluer[2] indicated that stress rotations caused by moving vehicle loads impact permanent deformation and rut accumulation. They concluded that the deformations were consistently higher on the tests simulating moving vehicle loads than those conducted	4.5 Loading conditions (cyclic and static) For some of the systems under discussion, the loading conditions immediately beneath the surface are cyclic of nature but is not limited to the variation of the magnitude. Rather the traffic loading causes a rotation in the principal stresses as the wheel approaches the point of interest, comes on top of the point of interest and moves away from the point of interest. As vehicles continue to traffic a pavement overlying unbound aggregate the stress distribution angle within the unbound aggregate typically decreases due to this cyclic loading which causes both a change in magnitude and change of principal axis. The accumulation of plastic deformations due to this type of loading leads to a reduction of the shear strength of the base course material. As a result, the maximum stress at the base and subgrade interface tends to increase over time.	

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					with single confining pressure simulating conditions that exist in the single point cyclic tests. [1] Dareeju, Biyanvilage, Chaminda Gallage, Manicka Dhanasekar, and Tatsuya Ishikawa, (2015). Cyclic Plastic Deformation Characteristics of Subgrade under Moving Train Wheel Load. Japanese Geotechnical Society Special Publication. 2. 10.3208/jgssp.TC202-02 [2] Kim, I. T., and Tutumluer, E., (2005). *Unbound Aggregate Rutting Models for Stress Rotations and Effects of Moving Wheel Loads*. Transportation Research Record: Journal of the Transportation Research Board, Volume 1913, 41–49.		
USA-027		4.5	3	Ed	Under static loading conditions, the load distribution angle remains the same over time for an uncontaminated (not clear, layer of unbound aggregate.	There can be fines contaminate or chemical contaminate. Think here it refers to fines containment. **Be specific**.	

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USA-028		4.7	1	te	However, for paved or unpaved roads, rutting potential or reduction in surface deformation is generally of greater concern. – reduction in surface deformation is NOT a “concern”.	Delete "reduction in"	
USA-029		4.8	1	te	Clarification of confinement…	confinement has been identified as the primary geosynthetic~~s~~ stabilization mechanism.	
USA-030		4.8	1	te	thereby reduces deformation of the aggregate layer, the stiffer composite stabilized layer also **restricts** deformation of the subgrade.	Change “restricts” to “reduces”.	
USA-031		4.8	1	ed	Many full-scale empirical trials	Delete “empirical”	
USA-032		4.9	1	ed	Comparing an unstabilized and stabilized aggregate layer in full-scale study	Change “unstabilized” to “non-stabilized”	
USA-033		4.9	2	te	For this reason, in addition to lateral confinement, the positive influence of separation and filtration geosynthetics can become significant.	For this reason, in addition to lateral confinement, the positive influence of separation, filtration and drainage geosynthetics can become significant.	
USA-034		6.2	2	te	Add calibration effort by Cuelho and Perkins, 2016.	The method ~~has only been~~ was originally calibrated for geogrids using the aperture stability modulus (measured by ASTM D7864) as the characteristic property of the geogrids. Other properties, or groups of properties, can be used to calibrate the method for all types of geogrids. Cuelho and Perkins (2016) [reference below] successfully calibrated the Giroud-Han equation using junction stiffness (ASTM D7737), based on performance data from multiple geogrids used in a controlled field study. In the past several years, hundreds of unpaved roads and areas in the United States, Canada and Latin America have been designed in a consistent manner using the Giroud-Han method and there have been no reported performance	

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						problems on projects designed using this method. Reference: E.V. Cuelho, S.W. Perkins, Geosynthetic Subgrade Stabilization – Field Testing and Design Method Calibration, Transportation Geotechnics (2016), doi: http://dx.doi.org/10.1016/j.trgeo.2016.10.002.	
LU-035	1	6.2.4	Key of Figure 9	ed	Key points numbers (5-8 on right side are too close to the text on the left side (1-4)	Create a bigger distance between left column key points and right column of the key points	
USA-036		6.3.1		te	A TBR value greater than 10 for any geosynthetic is very high, especially for paved applications.	Consider reducing the possible TBR value of 70 for geogrids…or at least describe the conditions/reference by which this value was determined.	
USA-037		6.3.1		te	Add reference to new ASTM International method to determine TBR based on AASHTO design.	When designing a geosynthetic stabilized pavement structure, one of the first steps AASHTO R50-09[43] suggests is assessing the target benefit of using a geosynthetic in terms of service life, reduction of base thickness or both. This leads the designer to choose whether to apply the TBR, the LCR, or the BCR approach. The cyclic plate load test (ASTM D8462) can be used to quantify performance benefit for geosynthetics used in paved or unpaved road applications.	
USA-038		7.2	3	te	Add ASTM D8462 reference	Trials used for calibration of TBR, BCR or LCR need to be as representative as possible of actual conditions in the field. Determination of the design parameters for a specific geosynthetic can be done using full-scale moving wheel tests which can be supplemented by cyclic plate loading tests (ASTM D8462). Also, documented case histories can provide valuable information complementing the data from full-scale tests, thereby contributing to the validation of the design parameters for a specific geosynthetic.	
USA-		8		te	Add section describing cyclic plate load tests.		

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039					ASTM D8462 is the standard for this test (based on AASHTO requirements) and can be used to generate the description.		
USA-040		A.1		te	Consider adding reference Cuelho and Perkins, 2016, which describes the development of the tensioned membrane effect and its relationship to geogrid material properties.	Reference: Cuelho, E. and Perkins, S. (2016) Mechanisms of Reinforcement Benefit from Geosynthetics Used as Subgrade Stabilization, EuroGeo 6, Ljubljana, Slovenia.	
USA-041		A.1	1	te	Add “significant” to first sentence because out of plane movement happens in all cases.	The tensioned membrane mechanism can occur only if significant out-of-the-plane deformations exist. In soft subgrade…	
DE-042		Whole document		te	DIN disagrees for the following reasons: The concept of stabilisation must be clearly limited to cases where stability is assured, and the aim is purely to limit deformations. It is dangerous to suggest that highly loaded working platforms on soft ground can be secured by the ‘stabilisation function’ described here. The ‘interlocking’ mechanism, which is attributed to the reinforcement function, provides the ‘lateral restrain’ effect of the stabilisation function. Basically, both functions have the same mechanisms of action. There is no clear distinction between the reinforcement and stabilisation functions in the document, making it impossible/extremely difficult for designers to distinguish between reinforcement and stabilisation applications. The document even mentions that in a two-layer base course, the bottom layer could act as reinforcement and the top layer as stabilisation. It is to be expected that a great deal of confusion will result from the lack of differentiation.	The document shall not be published due to safety-relevant issues. Legal steps will be considered.	

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					The current draft status contradicts EC 7 (EN 1997). A clear distinction must be made from structures covered by EC 7, e. g. working platforms, and misapplications must be ruled out. These are safety-relevant applications with a high risk potential that can endanger human life and the environment.		

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ISO_DTR 18228-5_ANSI.doc: Collation successful

ISO_DTR 18228-5_ASI.doc: Collation successful

ISO_DTR 18228-5_DIN.doc: Collation successful

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ISO_DTR 18228-5_TSE.doc: Collation successful

ISO_DTR 18228-5_UNI.doc: Collation successful

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CCT - Version 2021.1

ISO/TC 221/WG 6 "Design using geosynthetics"
Convenorship: **BSI**
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ISO policy brief_Combatting plastic pollution with International Standards

Document type	Related content	Document date	Expected action
Project / Other		2024-05-11	**INFO**

ISO policy brief: Combatting plastic pollution with International Standards

iso.org

Contents

Glossary of abbreviations

Abbreviation	Definition
EAC	East African Community
IEC	International Electrotechnical Commission
INC	Intergovernmental Negotiating Committee
ISO	International Organization for Standardization
ISO/CASCO	ISO Committee on conformity assessment
ISO/CS	ISO Central Secretariat
ITU	International Telecommunications Union
NSBs	National standards bodies
TBT	Technical barriers to trade
TC	Technical committee
UN	United Nations
UNEA	United Nations Environment Assembly
UNEP	United Nations Environment Programme
UNCTAD	United Nations Conference on Trade and Development
WSC	World Standards Cooperation
WTO	World Trade Organization

1. Introduction

To help ISO members engage more effectively and establish strong partnerships with policymakers and regulators, the ISO Central Secretariat (ISO/CS) launched a dedicated programme on standards and public policy in September 2023. This programme aims to equip national standards bodies (NSBs) with the necessary knowledge and tools to engage more effectively with policymakers and regulators using International Standards. These include conformity assessment standards as an additional instrument by which to achieve policy objectives across various sectors.

The flagship deliverable of this programme is the ISO standards and public policy: A toolkit for national standards bodies, which sets the overall framework. Building on this foundation, a comprehensive programme of action was designed to increase collaboration between NSBs, policymakers and regulators, sector by sector. It includes thematic policy briefs, workshops, research initiatives, case studies, peer-to-peer knowledge sharing and capacity building. The ultimate goal is to establish a vibrant global community of interest that utilizes International Standards to accomplish public policy objectives, foster trade, and promote international regulatory cooperation.

ISO policy briefs

The ISO thematic policy briefs are concise documents that aim to help ISO members prepare for their engagement with policymakers and regulators, particularly those outside their line ministry, on key policy issues. In each case, they offer members a global perspective and guidance on why the issue is a policy priority and challenge, and provide an overview of how governments are addressing this issue at the international, regional and national levels. They outline the role of International Standards and NSBs in supporting policy responses, and signpost key International Standards, supported by real-life examples, that can help policymakers achieve a range of policy objectives. Each document ends with suggestions and recommendations on how to stay abreast of ISO's technical work. The ISO policy briefs should be read alongside both the ISO toolkit and the ISO policy brief: A primer on public policy – Maximizing your NSBs engagement with policymakers, which explains the pivotal role of NSBs in supporting policy across various stages of the public policy life cycle (e.g. problem identification, policy analysis, policy formulation, stakeholder engagement and implementation).

One of these thematic publications is the *ISO policy brief: Combatting plastic pollution with International Standards*.

Acknowledgements

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Disclaimer

2. Global challenge: plastic pollution

Plastic is now used in almost every sector. Single-use packaging, fishing nets, agriculture, medical supplies, car parts, textiles, electronics and many more products and components are made of various types of polymers, most of which are virgin fossil-based materials.

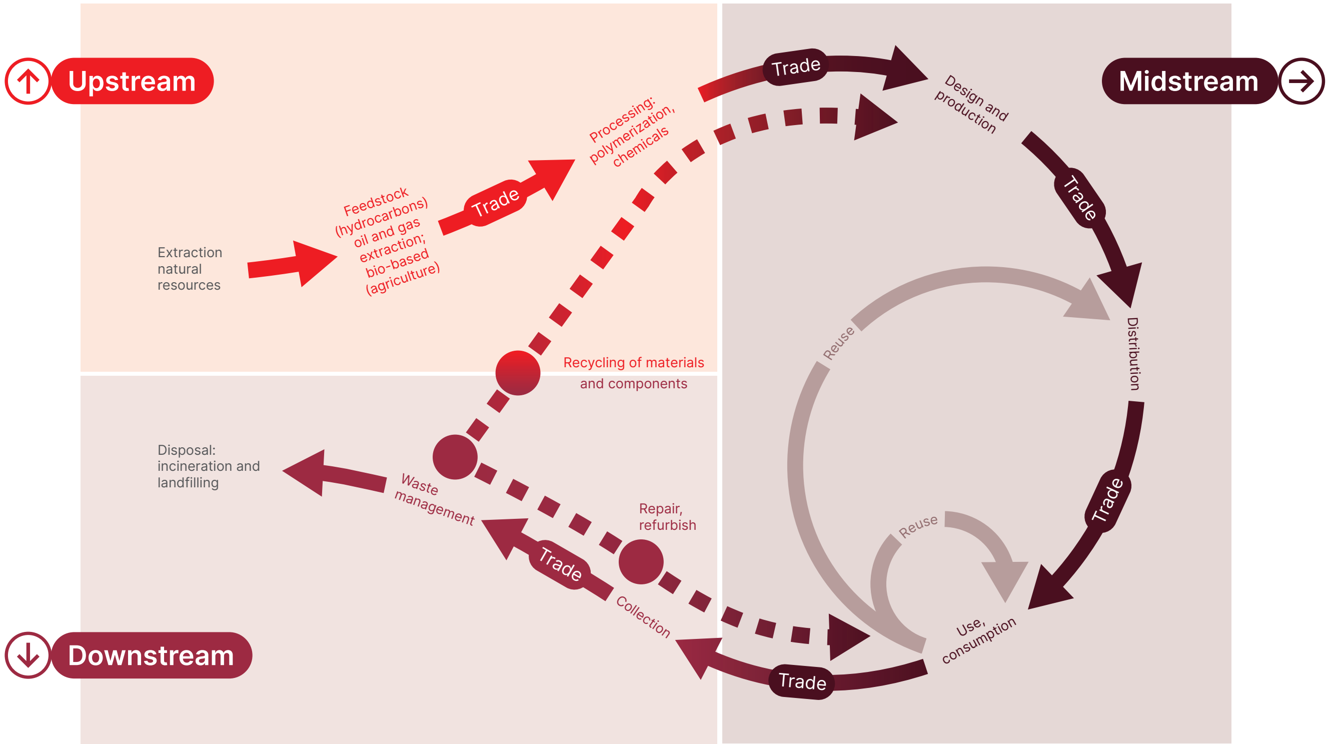
The world produces more than 380 million tonnes of plastic annually (Charron, 2023) and we are not adequately equipped to deal with the resulting waste and pollution: only 9 % of plastic is recycled (OECD, 2022), and at least 11 million metric tonnes of plastic enters the ocean every year (Ocean Conservancy, 2023), breaking down into micro- and nanoparticles. Microplastic is regularly detected in agricultural soil (Sa'adu & Farsang, 2023), in the air we breathe (Yale E360, 2022) and has already spread across the world via ocean currents and winds, even to the most remote locations (Spek, 2023).

Plastic pollution has significant adverse effects, not only on the ecosystems it infiltrates but also on human health and global climate systems. The accumulated annual costs associated with the health burden of the plastics life cycle has been estimated to be over USD 250 billion (Landrigan et al., 2023). The plastics life cycle is responsible for approximately 3.7 % of global greenhouse gas emissions, mostly because of the use of fossil fuels for manufacturing.

The adverse effects of plastic pollution are not evenly distributed: they are most keenly felt in the Global South and in small island states (Landrigan et al., 2023) that are situated downstream[1] in the plastics value chain.

1 "Downstream" includes collection, recycling, incineration and final disposal.

Figure 1: Illustration of the life cycle of plastic



Source: Plastic_Science_E.pdf (unep.org)

In 2021, the value of the global plastics trade was at least USD 1.2 trillion, representing around 5 % of all trade. Much of the trade flows of plastic are hidden or semi-hidden, e.g. embedded in products or through illegal trade in plastic waste. The current trade system does not facilitate the distribution of sustainable and safe plastic solutions. Policies do not yet sufficiently promote the adoption of non-plastic substitutes, with tariffs on fossil-fuel-based plastics often set at lower rates.

For instance, the average tariff worldwide for plastic straws is 7.7 %, whereas for paper straws it is 13.3 %, making the plastic-free version less competitive (UNCTAD, 2023).

Together with strong policies, trade measures and ambitious international commitments, International Standards can be instrumental in combatting plastic pollution and moving towards a globally safe, sustainable and circular plastic economy.

3. Policy context

Plastic pollution is a complex and transboundary problem requiring concerted action on all levels, from local to multinational. Although global efforts are underway to encourage countries to collectively address plastic pollution, historically, the issue has been approached in a fragmented manner.

Global

The most comprehensive process at a global level is the Intergovernmental Negotiating Committee (INC) that was set in motion by the UNEA Resolution 5/14 "End plastic pollution: towards an international legally binding instrument" (2022). The process aims to mandate coherent collective global action and to address the full life cycle of plastic, for the first time, starting from the source. To keep up with the latest INC developments, see: unep.org/inc-plastic-pollution.

Before the launch of the INC process, plastics pollution was addressed in parts of other environmental agreements, typically focusing on the waste and end-of-life stages of the plastics life cycle (for example, the Basel Convention[2] targets the transboundary movements of hazardous waste, and the London Convention[3] prohibits intentional dumping of waste at sea).

Since trade in plastics represents a substantive part of global trade, the Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade (DPP) was launched in 2020 at the World Trade Organization (WTO). The primary objective of its currently 79 co-sponsors is to explore options for improved trade cooperation to reduce plastics pollution and transition to a more circular and environmentally sustainable global plastics economy, complementing existing international processes in other fora (WTO, n.d.).

The 13th WTO Ministerial Statement 2024 put forward by the coordinators of the Dialogue highlights the importance of fostering collaboration with international organizations such as ISO, and specifically encourages promotion of cooperation on standards to support the transparency of global trade flows. To read the latest statements and keep up with discussions at the WTO, see: wto.org/english/tratop_e/ppesp_e/ppesp_e.htm.

Regional

The European Union's Circular Economy Action Plan is one of the only regional instruments that addresses the upstream[4] stages of the plastics life cycle. It targets product design, promotes circular economy processes, encourages sustainable consumption, and aims to prevent waste, including plastic waste (European Commission, n.d.). Other regions, such as the East African Community (EAC), are working on harmonized regional approaches (incl. legislative solutions) to address plastic pollution, which has led to a draft East African Single Use Plastics Bill (2023).

Regional policies have cascading implications for national economies: producers must adopt sustainable solutions (e.g. alternative packaging materials) and meet labelling requirements, to maintain market access and even "lock out" companies that are non-compliant with new regulations.
For example, with the entry into force of

2 The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, often called the Basel Convention, is a global treaty designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to developing countries.
3 The Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972, called the "London Convention" for short, is one of the first global conventions to protect the marine environment from human activities.
4 "Upstream" includes production and design of polymers and plastic products.

EU Directive 2019/904, it will no longer be possible to place certain commonly used single-use plastics products on the European market. Governments will need to consider the implications of such measures on global trade and the economy.

In addition, regional agreements adopted under the Regional Seas Conventions also address pollution, including plastic pollution. For example, the Cartagena Convention[5] is an agreement that imposes obligations aimed at preventing, reducing and controlling pollution in the waters within the designated Convention area. Additionally, the Secretariat of the Convention supports various marine litter projects and reforms. (The Caribbean Environment Programme (CEP), n.d.)

National

A challenge for national policymakers is the implementation and alignment of international and regional obligations with national policy objectives and capacities. The current landscape of national plastic and circular economy policies is fragmented and does not address the full scope of the plastic crisis.

Table 1 gives an overview of available trade-related instruments identified by the WTO (2023) that policymakers could leverage at different life-cycle stages. More specific examples of various national trade-related policies targeting plastic pollution can be found in the survey of the WTO Members published by the DPP (see here: https://docs.wto.org/dol2fe/Pages/SS/directdoc.aspx?filename=q:/INF/TEIDP/W11.pdf&Open=True)

Table 1: Commonly applied national trade-related plastics measures

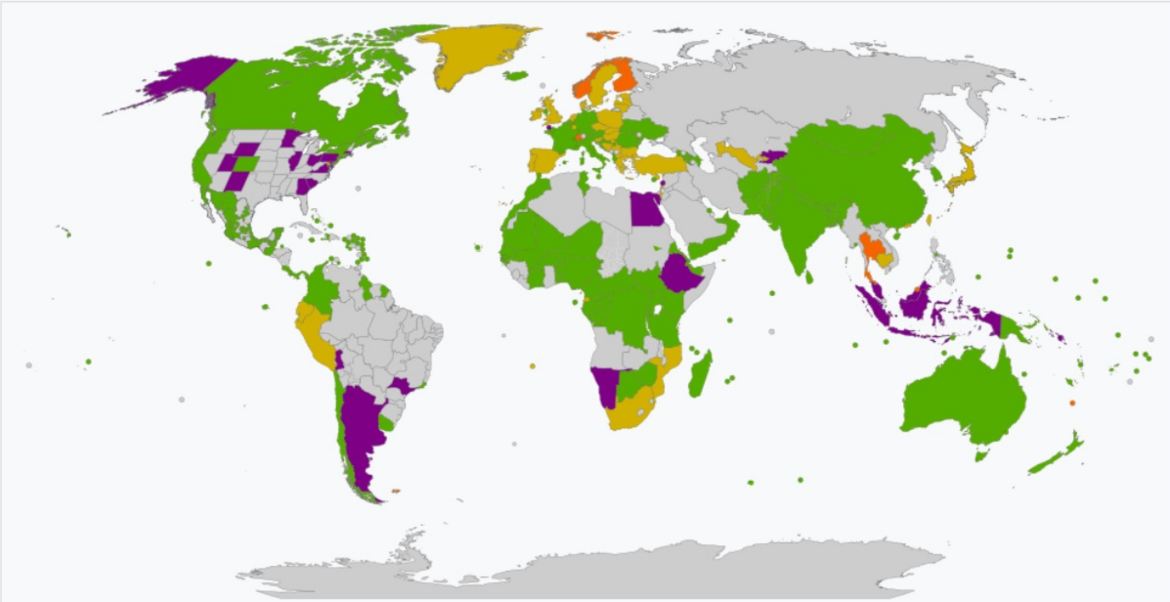
Sustainability measures	Market-based tools	Supporting measures
• Bans/restrictions on import and export of waste, including export licences • Import licensing for plastic bag components • Minimum recycled content • Minimum thickness [of plastic bags], (re)usability • Exclusion of certain components • Voluntary guidelines for plastic-containing products • Labelling requirements	• Environmental and chemical taxes (applied to plastics) • Deposit schemes and other Extended Producer Responsibility (EPR) schemes • [Preferential] tariffs on certain goods, including tariff quotas • Packaging fees • Trade defence tools (e.g. applied to non-plastic substitutes)	• Preferential tax treatment for alternatives and non-plastic substitutes • Direct grants to Research & Development • Government procurement requirements and preferential rates for goods with recycled content • Expenditure on resource utilization of agricultural wastes, incl. recycling of waste plastic films

Source: WTO 2023

Research has shown that governments are more likely to adopt regulatory instruments (e.g. bans) than economic incentives (e.g. taxes) (Virdin et al., 2020). For bans, plastic bags remain the most commonly regulated item: as of 2022, more than 90 countries have imposed a complete ban or partial ban on plastic bags (see Figure 2).

5 Cartagena Convention is the term used to refer to the Convention for the Protection and Development of the Marine Environment in the Wider Caribbean Region.

Figure 2: Plastic bag legislation around the world



Phase-out of lightweight plastic bags around the world (laws passed but not yet in effect are not shown on map)

- Plastic bags banned
- A charge on some plastic bags
- Voluntary charge agreement
- Partial charge or ban (municipal or regional levels)

Source: Plastic bag ban - Wikipedia

For national bans and restrictions to be effective, implementation measures need to be in place, such as tracking the volume of imports and availability of technology to detect hazardous polymers and embedded plastic (World Economic Forum, 2022).

4. Standards in support of policy responses

International Standards can play an important role in supporting national public policy development and implementation – See *ISO policy brief: A primer on public policy – International Standards and NSBs* for more information. Preparing and adopting public policies is the responsibility of policymakers and regulators. NSBs can play a vital role in supporting public policy by providing expertise, guidance and resources related to technical standards and international good practices. Their involvement can help ensure that policies are well-informed, effective and aligned with International Standards.

International Standards, as developed by ISO, IEC and ITU, jointly known as the World Standards Cooperation (WSC), are global solutions that respond to market needs and are informed by the collective knowledge of global experts through a multi-stakeholder consensus-based process. These standards encompass a broad spectrum of perspectives and expertise, including those related to social, environmental and economic concerns. They serve as guidelines and harmonized best practices to ensure consistency, build trust and facilitate international cooperation among countries and stakeholders. International Standards, developed by the WSC, are in line with the WTO Technical Barriers to Trade's six principles for the development of international standards, guides and recommendations. Therefore, there is a presumption that they do not cause any unnecessary obstacles to trade.

The referencing of International Standards in technical regulation, legislation or policies allows regulators to save resources by relying on internationally agreed good practice. It significantly increases the acceptance of policy guidance or legislation and helps to keep the regulation up to date and separate from the political timetable. From an international perspective, it can promote regulatory cooperation and facilitate trade. For this reason, International Standards not only play a vital role in policy implementation, but also have a substantial impact on the development of public policy across various domains.

The value of the ISO system is not solely in the standards development process and governance framework, but also in its extensive global network/membership comprising 170 national members, each with one voice representing their respective country. All members are welcome to join ISO/IEC technical committees (TCs) and contribute to the International Standards development process. Standards emerging from this process carry inherent legitimacy and international buy-in; hence they receive widespread acceptance as they are based on global needs and are the result of systematic collaboration and consensus. As a result, ISO standards have worldwide credibility and, once a consensus-based standard is agreed by the members, it can be adopted nationally by all ISO members, either as is or with adjustments to meet the national requirements and/or context. As such, International Standards offer a cost-effective means of disseminating knowledge across borders, as well as ensuring widespread adoption. ISO standards are widely used by the public and private sectors.

Standardization efforts that aim to address various aspects of plastic pollution are currently ongoing on all levels – national, regional and international. The following overview provides examples and insights into how policymakers can use International Standards as valuable tools when crafting national regulations, strategies and plans to achieve policy objectives aimed at combatting plastic pollution and advancing towards a sustainable and circular economy. From product design and labelling to waste management and conformity assessment, standards can support policy measures such as national regulation, strategies, incentives, bans, restrictions, and more.

Sustainable design

Much of a product's impact across its life cycle, including its recyclability, is determined at the design phase. Promoting best practice, ISO 14006, *Environmental management systems – Guidelines for incorporating ecodesign*, can serve as a starting point for establishing a general ecodesign framework, which will subsequently facilitate the adoption of specific market access requirements tailored to individual products.

Single-use plastics contribute significantly to the plastic pollution crisis. More products need to be designed for reuse (Ellen MacArthur Foundation, n.d.). Currently, the most common way to promote reuse is to restrict single-use products, for example with plastic bag levies (Plastic Smart Cities, 2023), but these restrictions can be complemented with positive measures that support the design and development of reusable packaging, and encourage businesses to implement such systems. ISO 18603:2013, *Packaging and the environment – Reuse*, provides the requirements for a packaging to be classified as reusable and sets out procedures for assessing compliance with these requirements.

Example

French National Pact on Plastic Packaging (2019) cites the definition of "reuse" and "reusable packaging" from ISO 18603:2013.

See ISO/TC 207 and ISO/TC 122 for more information and standards.

Transparency and ecolabelling

With the proliferation of ecolabels, including self-declared claims, standardized guidance can help prevent greenwashing and strengthen consumer trust by imposing verification requirements (BCG, 2022). ISO 14021, *Environmental labels and declarations – Self-declared environmental claims (Type II environmental labelling)*, provides a verification methodology and specifies requirements for self-declared environmental claims, including statements, symbols and graphics.

With the wide variety of plastic products, types of polymers and chemical additives on the market, guidance for the uniformity of declaration of the chemical makeup of a product can be instrumental. Such guidelines can be found in ISO 1043-2, *Plastics – Symbols and abbreviated terms – Part 2: Fillers and reinforcing materials,* and ISO 16620-5, *Plastics – Biobased content – Part 5: Declaration of biobased carbon content, biobased synthetic polymer content and biobased mass content*. These standards help clearly identify and mark products, which can help enforce policies that target a specific chemical, polymer or type of product (e.g. non-biodegradable plastic bans).

Several standards provide definitions and technical requirements specifically for biodegradable and compostable products, such as ISO 5412, *Plastics – Industrial compostable plastic shopping bags*, and ISO 5424, *Plastics – Industrial compostable plastic drinking straws*. These and other standards can be instrumental in promoting sustainable substitutes for single-use products.

Example

Incorporation of Directive (EU) 2019/904 in Greece states that plastic products should be visibly marked (e.g. if they are recyclable) according to EN ISO 14021 or equivalent standard.

See ISO/TC 207 and ISO/TC 61 for more information and standards.

Waste management

Standardized marking and labelling (see section above) can also help ensure proper sorting and collection of plastic waste, which is essential to fast-track recycling and prevent contamination of recycled feedstock. Other standards that can help expedite waste sorting include ISO 11469, *Plastics – Generic identification and marking of plastics products*, and ISO/TR 18568, *Packaging and the environment – Marking for material identification*.

The subsequent recycling of sorted waste necessitates waste management infrastructure, for which International Standards can provide a basis of technical expertise. ISO 14001 and related standards can serve as the foundation for ensuring that infrastructure-related projects adhere to environmental best practices and demonstrate compliance through certification. Compliance with International Standards could form part of the evaluation criteria when financing such projects, as well as mitigate risk, since ISO certification enjoys global recognition and is consistent and comparable worldwide.

Aimed specifically at packaging, ISO 18604, *Packaging and the environment – Material recycling*, outlines requirements for the recycling of materials while accommodating the ongoing development of both packaging and recovery technologies. These standards can form part of a national strategy – or national action plan – for sound waste management and recycling, and the certifications they offer can help government agencies to keep track of the industry's progress.

Example

In the approval of the national solid waste management strategy, Vietnamese policymakers refer to the ISO 14000 series of standards: "The Ministry of Industry and Trade shall support enterprises and owners of waste sources in implementing plans to prevent and reduce waste and apply cleaner production methods and environmental control system ISO 14000; and elaborate and implement a master plan to develop the environmental industry, including the waste recycling industry".

See ISO/TC 207, ISO/TC 122 and ISO/TC 61 for more information and standards.

Conformity assessment

Conformity assessment procedures play a crucial role in verifying and testing whether a product complies with national rules and regulations. For example, when a product undergoes laboratory testing, compliance with the standards outlined in the CASCO Toolbox can ensure that the facility is capable of performing reliable testing (e.g. checking that a product is free from toxic chemicals or testing for microplastic particles in drinking water).

Example

Annex III of EU directive 2020/2184 on water quality states that "Member States shall ensure that laboratories or parties contracted by laboratories apply quality management system practices in accordance with EN ISO/IEC 17025 or other equivalent standards accepted at international level."

See the ISO Committee on conformity assessment (CASCO) for more information and standards.

Towards greater sustainability

Innovative system approaches, such as the circular economy, can greatly benefit from standardization and well-defined terminology to facilitate their implementation and prevent greenwashing. ISO/TC 323, *Circular economy,* develops International Standards on terminology and principles, measuring and assessing circularity, as well as on the transition of business models and value networks. These standards can be incorporated into national strategies, directives or action plans for the circular economy, serving as essential components of accountability and compliance mechanisms.

Finally, ISO is constantly responding to emerging challenges and new areas of academic and public interest, such as standardized methods for sampling and measuring microplastics in the environment (ISO 24187, *Principles for the analysis of microplastics present in the environment*). By using ISO 24187 and other standards from ISO/TC 61, governments can effectively coordinate efforts for monitoring plastic pollution, formulating policies and organizing cleanup and remediation activities.

5. Key messages

1. **Plastic pollution is a pervasive transboundary problem that has negative impacts on the global economy, human health and the environment, and requires a comprehensive and holistic policy response.**

2. **Unlike the INC process, which aims to address the whole life cycle of plastic and serve as a comprehensive tool in the transition towards a circular economy, most agreements, regional and national policies and regulations target a specific aspect of the plastic pollution problem.**

3. **Preparing and adopting public policies is the responsibility of policymakers and regulators. NSBs can play a vital role in supporting public policy by providing expertise, guidance and resources related to technical standards and international good practices. Their involvement can help ensure that policies are well-informed, effective and aligned with international standards.**

4. **An ISO International Standard represents global consensus on best practice for the subject the standard relates to. Together with strong policies, trade measures and ambitious global commitments, International Standards can help establish a safe, sustainable and circular plastic economy.**

5. Using globally recognized terms and definitions, as well as standardized and clear ecolabelling requirements, can help strengthen consumer trust and prevent greenwashing.

6. Standardized marking and labelling systems can also help enforce policies that target a specific chemical, polymer or type of product (e.g. non-biodegradable plastic bans), and streamline sorting and recycling.

7. Using International Standards to evaluate costly projects for the construction or renovation of local recycling and recovery facilities can ensure that these are based on the latest technical expertise and help mitigate risks.

8. Conformity assessment procedures play a crucial role in verifying and testing whether a product adheres to national rules and regulations, forming an integral part of the national compliance mechanism. Certification to ISO standards is globally recognized, and is consistent and comparable worldwide.

6. How can I get involved?

To combat plastic pollution, we need to work together.

NSBs:

To follow or contribute to ISO's technical work on plastics, see the relevant committees:

- ISO/TC 61, *Plastics,* and its subcommittees:
  - ISO/TC 61/SC 14, *Environmental aspects*
  - ISO/TC 122/SC 4, *Packaging and the environment*
- ISO/TC 207, *Environmental management*
- ISO/TC 323, *Circular economy*

Stakeholders:

→ If you have expertise related to plastics and would like to contribute to the development of standards, please contact the ISO member in your country (www.iso.org/members.html).

→ For more information about this publication, please contact the ISO Strategy and Research Unit (research@iso.org) and ISO Capacity Building Unit (capacity@iso.org).

→ For more information about ISO standards for plastics, we encourage you to contact the ISO Sustainability Unit (climate@iso.org).

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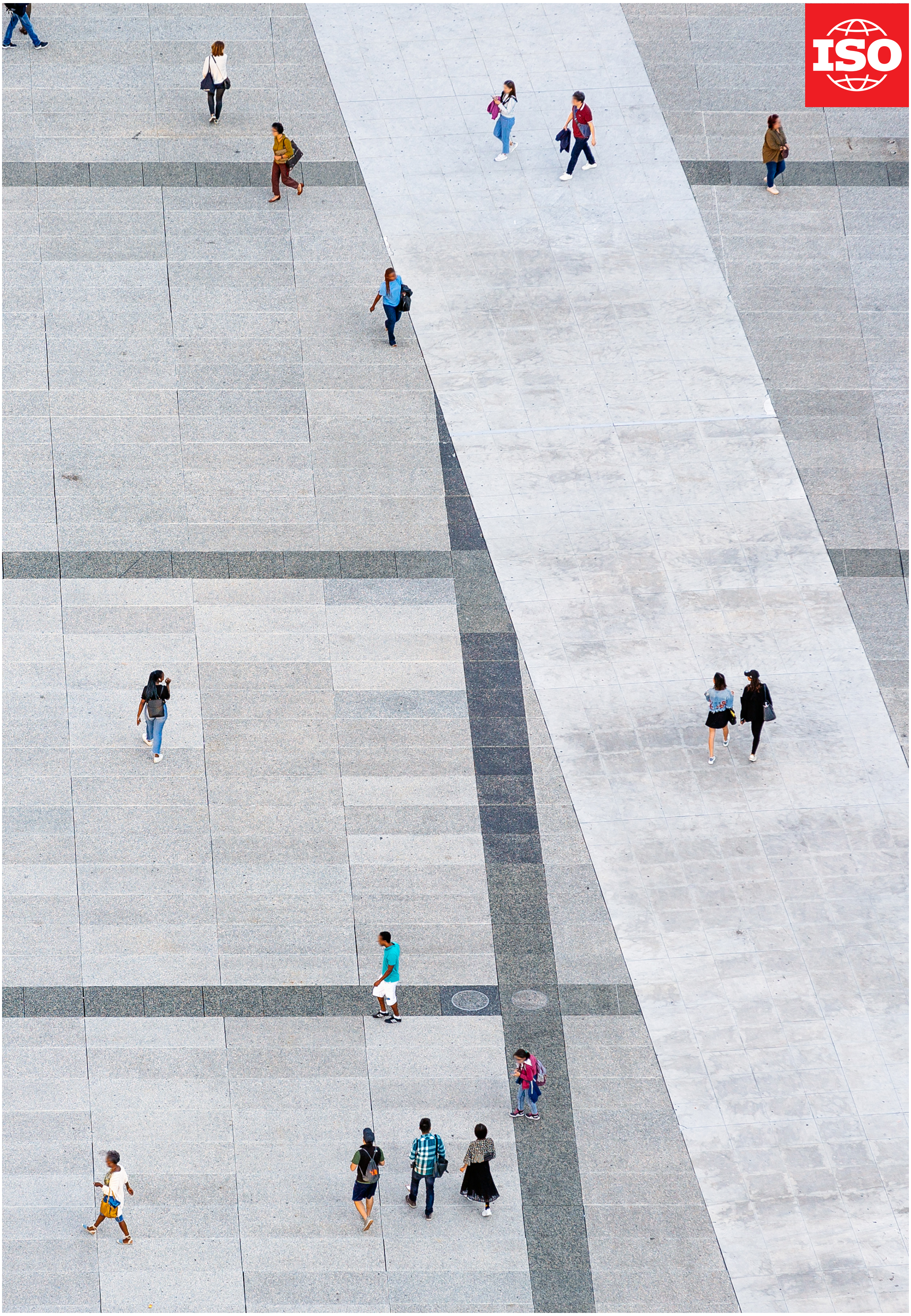

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