Webinar 'Inclusive standards: European Commission's study on Anthropometrics in harmonized standards'

A webinar in cooperation with DG GROW

We start at 15:00 CET

Webinar moderator

Els SOMERS
Project Manager
Policy & Partnerships
CEN-CENELEC
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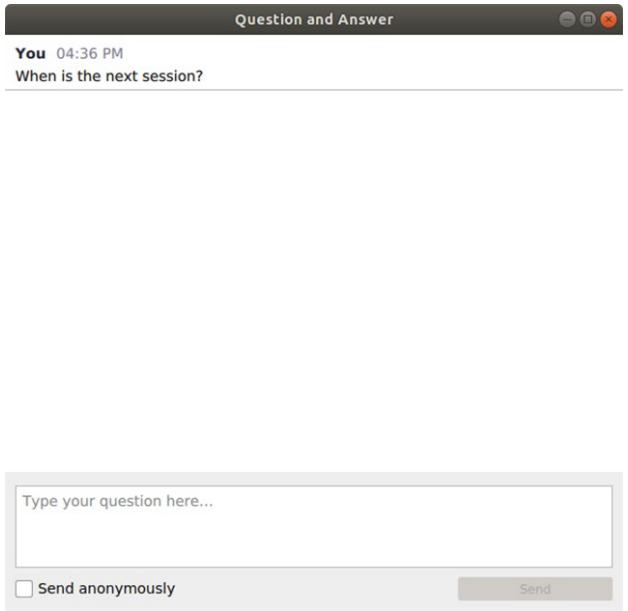
Get the most out of the webinar today

- You are muted
- Use the Q&A panel to submit your questions



- Talk about us on Twitter #training4standards @Standards4EU

Your speakers today

Deborah WAUTIER

Project Manager Policy & Partnerships

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Policy Officer – DG GROW-H2

European Commission

Sandra Alemany

Expert in CEN/TC 122/WG 1 'Anthropometry'

Gerd Küchmeister

Expert in CEN/TC 122/WG 1 'Anthropometry'

Agenda

- Inclusiveness in the CEN and CENELEC System
- European Commission’s study on Anthropometrics in harmonized standards
  - Objectives
  - Scope
  - Methodology and timeline
- Experts' testimonial - CEN/TC 122/WG 1 'Anthropometry’
- Call for voluntary contribution from CEN and CENELEC experts
- Q&A

Inclusiveness of the CEN and CENELEC System

- CEN and CENELEC are committed to an **inclusive, transparent and open** standardization system
  - Goal 4 - *An **Inclusive** CEN and CENELEC System to be the preferred choice for standardization in Europe*

➔ **Inclusive *is* the standard**

Read more

Inclusive equation

Why does it matter for Standard-makers?

- Diversity in standard-making processes = Higher-quality standards
- High-quality standards = Inclusive of all specificities and needs
- Inclusive standards = Products that benefit everyone equally

Taking actions – some examples

- CEN/BT/Working Group 213 'Strategic Advisory Group on Accessibility' (SAGA)
- Design for All protocol for standardizers
- CEN-CENELEC Gender Action Plan (2023-2025)
- UNECE Declaration on GRSI → Signatories, with 20+ of CEN and CENELEC Members as individual signatories
- Global commitment towards GRSI: Joint efforts from ISO, IEC, UNECE, etc.
  - Guidelines, checklists, webinar, trainings,...
- …

→ **Support to any progress towards Inclusive standards**

Inclusiveness – anthropometrics in harmonised standards

Context and content of on-going study

GROW.H.2, May 2023

15 June 2022

Episode 1: Morally Indefensible PPE

When the pandemic hit, Caroline Criado Perez was inundated with messages from female hea
their PPE – things like masks and goggles – didn't fit. In this first episode of her brand new in
she goes on the hunt for missing data and asks: can we fix PPE?

Forbes

BREAKING • BUSINESS

A Lot Of PPE Doesn't Fit Women—And In The Coronavirus Pandemic, It Puts Them In Danger

Carlie Porterfield Forbes Staff
I cover breaking news.

Follow

Apr 29, 2020, 04:42pm EDT

MENU l'éditiondusoir | CORONAVIRUS

ACTUALITÉ

Pourquoi les masques protègent-ils moins bien les femmes ?

Par Virginie ENÉE

Plus personne ne sort sans son masque. Mais qu'il soit jetable ou en tissu, il est mal fichu pour un humain sur deux… Une norme de la « taille unique » révélatrice d'un monde fait par et pour les hommes.

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This article is more than **2 years old**

Sexism on the Covid-19 frontline: 'PPE is made for a 6ft 3in rugby player'

Health professionals, experts and unions say poorly fitting equipment is risking lives of female workers

SRF News Sport Meteo Kultur Dok Wissen

«Espresso Aha!»: Einwegmasken: Einheitsgrösse Nachteil für Frauen

Aus Espresso vom 30.11.2020.

News > Schweiz >

Einwegmasken

Hygienemasken: Einheitsgrösse ist für Frauen ein Nachteil

Anders als bei Stoffmasken gibt es bei den Hygienemasken nur eine Grösse. Die passt allerdings nicht allen gleich gut.

AD NIEUWS REGIO SPORT SHOW PLAY PODCAST PUZZEL

Binnenland Buitenland Politiek Economie Bizar Wetenschap Reizen Opinie

Hilariteit over veel te grote mondkapjes in België: 'Dank voor de bikini'

In het Belgische Aalst - en ook in heel wat andere Oost-Vlaamse

Masks fit only Jim’s face

In EU, masks are tested on the so called ‘**Sheffield head’**, which is the face of Jim, a former British employee of a Sheffield laboratory.

It neglects women and is not representative for the EU male population either.

European Commission

Not just the face…

- “A panel of ten clean-shaven persons (without beard or sideburns) shall be selected covering the spectrum of facial characteristics of typical users (excluding significant abnormalities).”
- “For the test, persons shall be selected who are familiar with using such or similar equipment.”

Masks will become more inclusive

- End-2021: Commission requested CEN to develop a new mask standard
- CEN suggests to use an international standard that prescribes five head forms and representative samples (ISO 16976-2:2015).
- Is this ISO standard, based on US population, fit for the EU?

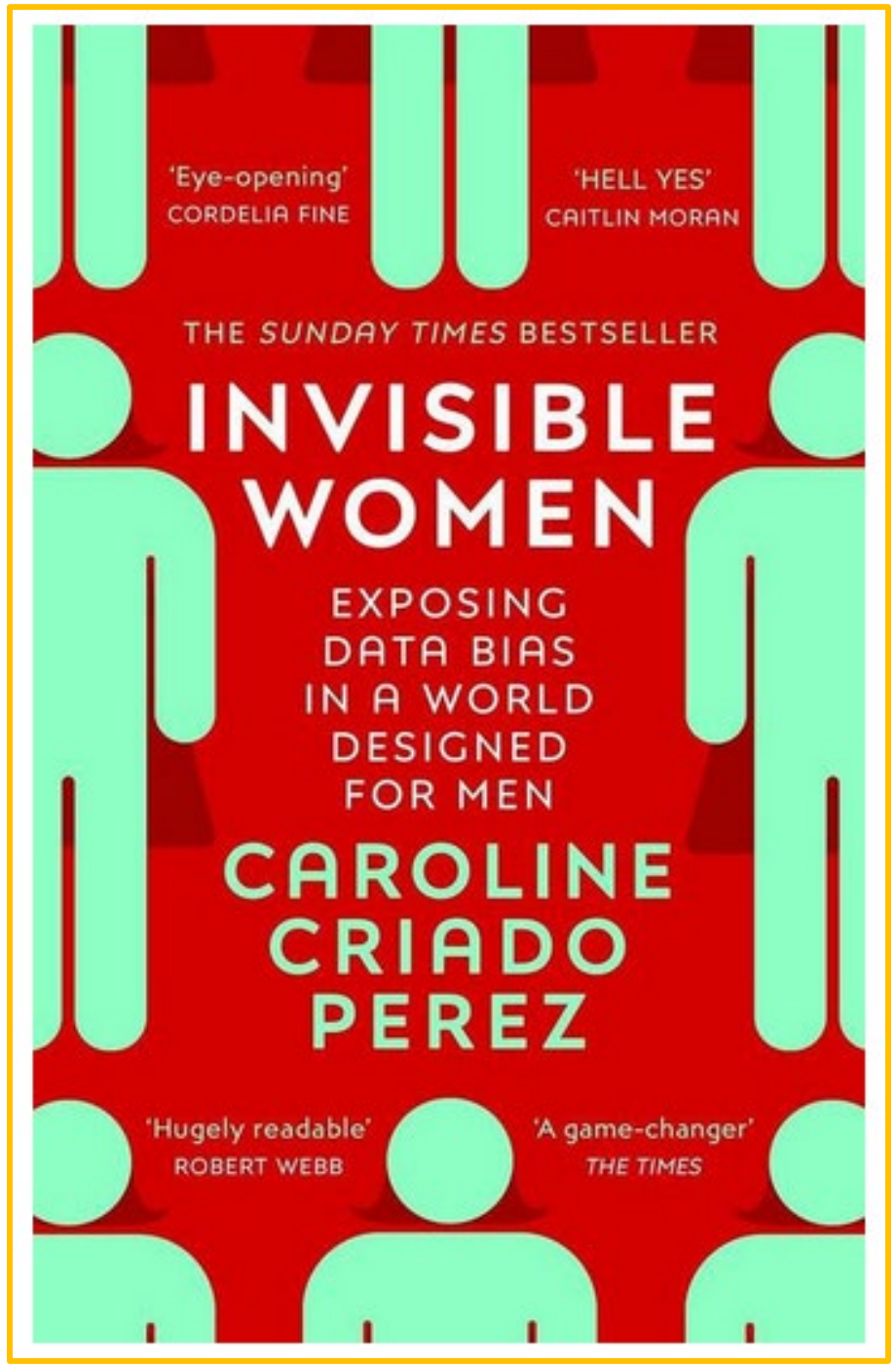
This is just the tip of the iceberg

- **Personal Protection Equipment**

  Personal eye protection: “The medium head-form approximates a 50th percentile adult male. The small head-form approximates a 60th percentile, 12 year old child.” (EN168:2001)

- **Radio Equipment**

  Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices: “The dimensions of the SAM phantom have been derived from selected 90th percentile male head data reported by Gordon et al.” – Gordon et al. is a 1988 study of the U.S. Army Personnel. (IEC/IEEE 62209-1528; **2020**)



Caroline Criado Perez views regulatory standards as a major tool for making the world safer for women.

European Commission

What do inclusive standards look like?

- Equity: Equal performance regarding all essential requirements across the EU's diverse population, i.e. regardless of gender, age, height etc.
- The advantages and disadvantages should be fairly distributed.
- Based on recent, representative data
- Considering the design and testing of products
- Ranges rather than averages
- Considering all relevant body dimensions and physical capabilities such as body size, body structure, body composition, physical strength limits, operating postures and movements etc.

Assessing existing harmonised standards

Study to produce list of non-inclusive standards by end 2023

- Task 1: **Methodology** – applicable to any policy area
- Task 2: **Assessment** and prioritization of ca. 4,000 harmonised standards within GROW.H.2's remit
- Task 3: **Workshops** with main stakeholders on two selected high-priority standards.

We need to have the anthropometric data to update the standards.

Scope study

Mechanical engineering and means of transport

- Machinery Directive (2006/42/EC)
- Lift Directive (2014/33/EU)
- Pressure Equipment Directive (2014/68/EU)
- Simple Pressure Vessels Directive (2014/29/EU)
- Aerosol Dispensers Directive (75/324/EEC)
- Equipment for potentially explosive atmospheres Directive (2014/34/EU)
- Cableway Installations Regulation (2016/424/EU)
- Recreational Craft and Personal Watercraft Directive (2013/53/EU)
- Gas Appliances Regulation (2016/426/EU)

Sustainability

- Pre-packaged products (76/211/EEC)
- Pack sized (2007/45/EC)

Consumers and workers protection

- Personal Protective Equipment Regulation (2016/425/EU)
- Noise Emission From Outdoor Equipment Directive (2000/14/EC)

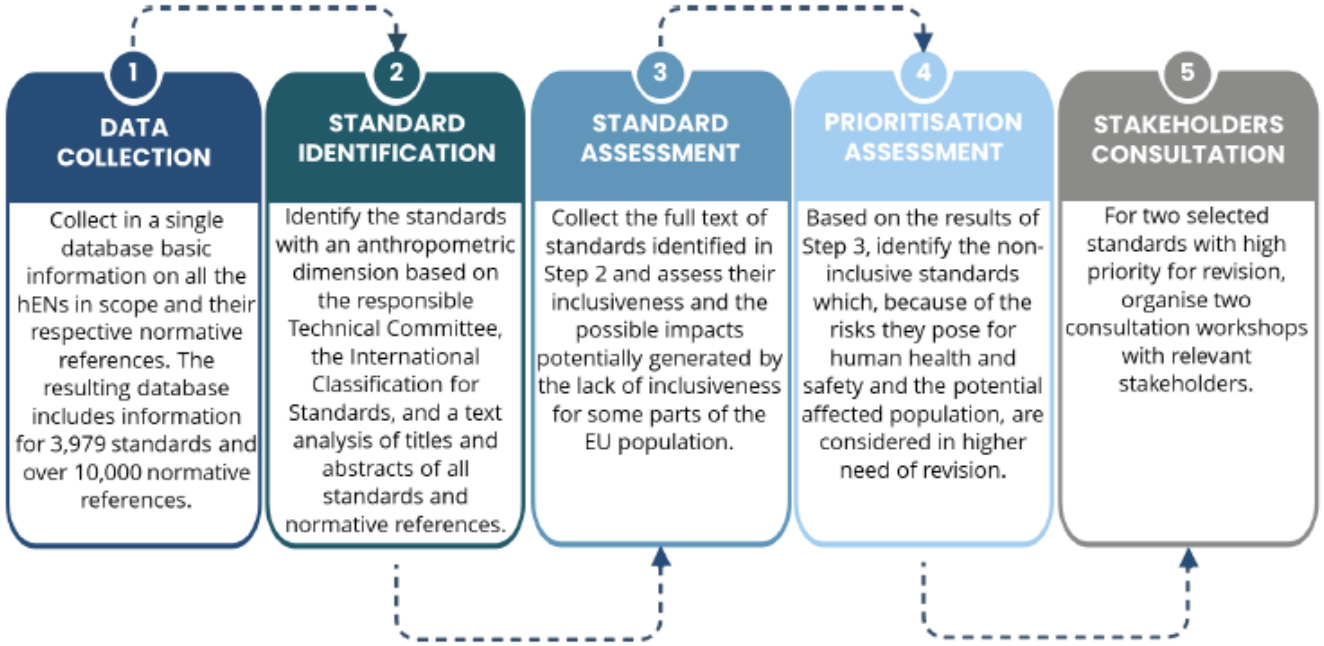
Electric and electronic engineering

- Low Voltage Directive (2014/35/EU)
- Electromagnetic Compatibility Directive (2014/30/EU)
- Radio Equipment Directive (2014/53/EU)

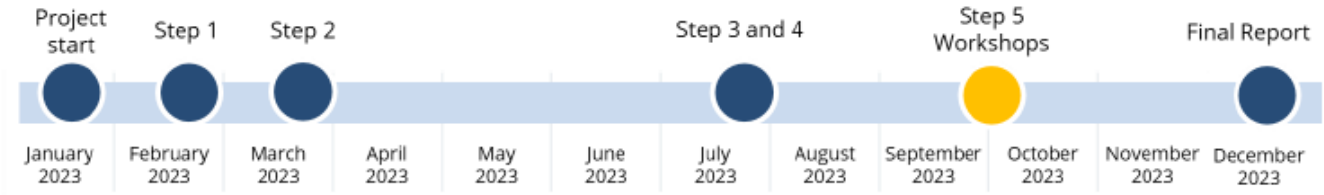
Measuring technology

- Units of Measurement (80/181/EEC)
- Bottles as Measuring Containers (75/107/EEC)
- Metrology Framework (2009/34/EC)
- Non-Automatic Weighting Instruments (2014/31/EU)
- Measuring Instruments (2014/32/EU)

Timeline study

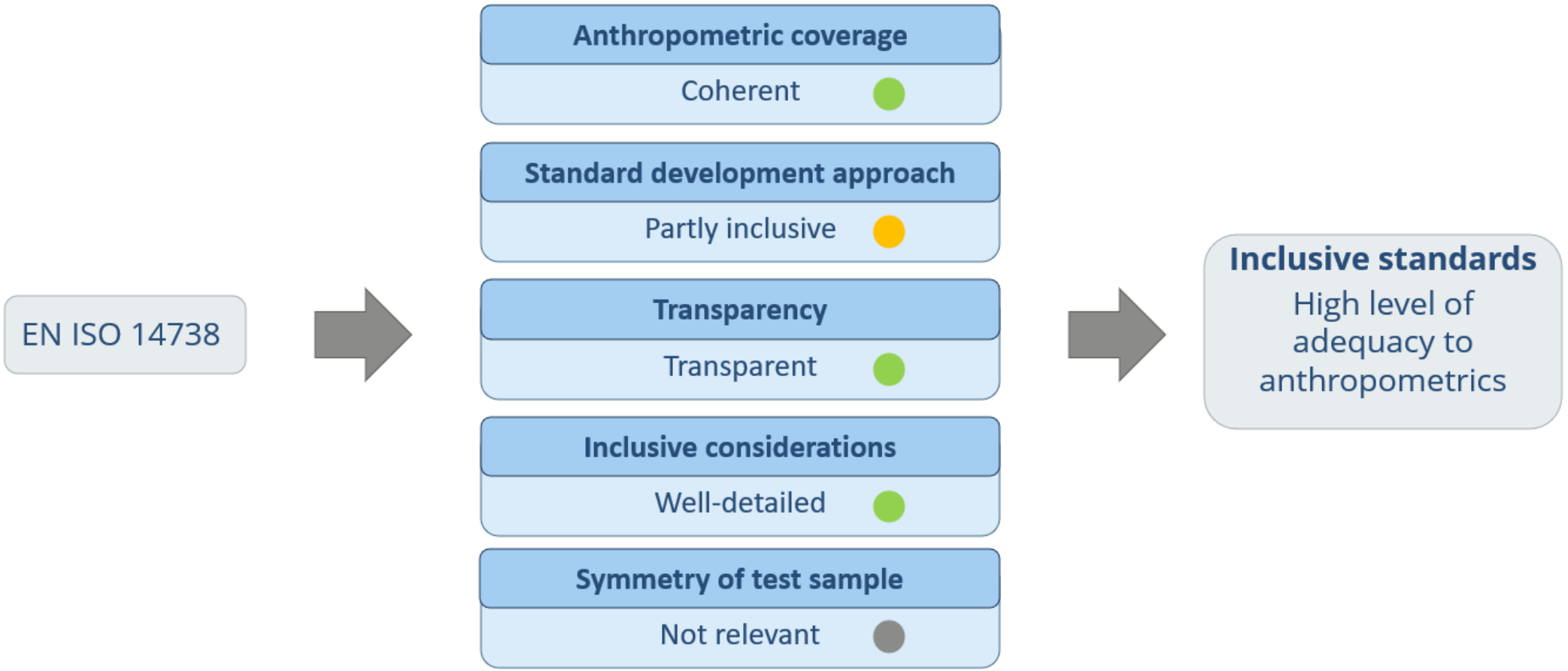


Timeline



European Commission

Methodology to assess standards



GROW can make the difference

Adjust template for standardisation requests	> Working on new template with Legal Service
Request affected European harmonised standards to be revised	> Study to identify outdated standards in the making
Collection of anthropometric data	> Call for standardisation action grant for feasibility study for a measurement campaign

Experts' testimonial
CEN/TC 122/WG 1 'Anthropometry’

Background

Anthropometric and strength data of children for use in standardization

Objective

To **identify**, **acquire** and **measure** the **anthropometric data of children** required by the relevant stakeholders and to **develop guidance** for them and for standards writers on the **correct application of anthropometric data** (body measures and physical strength) and to publish this information in CEN Technical Report(s).

Background

- The project is being carried out by CEN/TC 122 “Ergonomics” and in particular CEN/TC 122/WG 1 “Anthropometry” *(both secretariats are held by DIN)*
- Several other committees were involved in the project (e.g. by taking part in interviews, workshops or attending meetings) or still are involved in the project (e.g. by liaison), for example:
  - CEN/TC 52 “Safety of toys”
  - CEN/TC 136 “Sports, playground and other recreational facilities and equipment”
  - CEN/TC 136/SC 1 “Playground equipment”
  - CEN/TC 152 “Fairground and amusement park machinery and structures – Safety”
  - CEN/TC 159 “Hearing protectors”
  - CEN/TC 207 “Furniture”
  - CEN/TC 248 “Textiles and textile products”
  - CEN/TC 252 “Child care articles”
  - CEN/TC 333 “Cycles”
  - CEN/TC 364 “High Chairs”
  - CEN/TC 398 “Child Protective Products”
  - CEN/TC 402 “Domestic pools and Spas”

Project outline

PHASE 1
Research on the demand and availability of anthropometric data of children

Objectives:
- Existence/availability of anthropometric data.
- Demands on anthropometric data.
- Gap Analysis.

Result:
CEN/TR 17698 Ergonomics - Demands and Availability of anthropometric and strength data of children in Europe
Approved 2021.09

PHASE2

Anthropometric and strength study of children in Europe

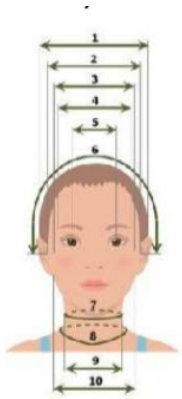
Objectives:
- Acquisition of available data.
- Development of the measurement programme (2 EU countries).
- Assessment, processing, integration and analysis of databases.
- Generation of statistical tables.

Guidelines for the application of anthropometric and strength data in Europe

Objectives:
- Guidelines on how to correctly apply anthropometric and strength data of children.

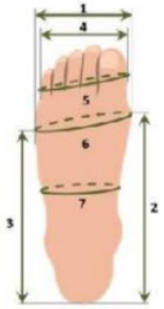
Results:
- New CEN Technical Report on anthropometric and strength data of children in Europe
- New CEN Technical Report on the application of anthropometric and strength data

Anthropometric data needed by the stakeholders

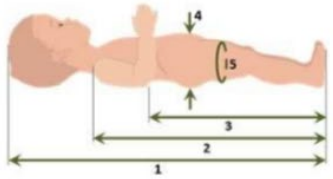


HEAD, FACE AND NECK MEASURES

HAND MEASURES

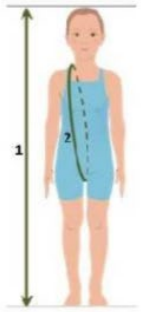


FOOT MEASURES



BODY MEASURES RELATED TO LYING POSTURE (SUPINE)

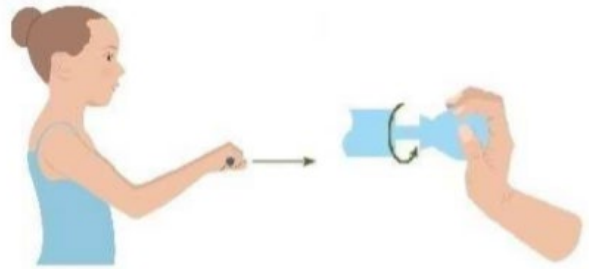
BODY MEASURES RELATED TO SITTING POSTURE



BODY MEASURES RELATED TO STANDING POSTURE

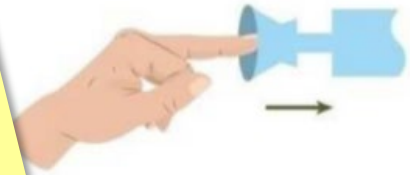
REACH MEASURES

- Review of standards and papers to define an extended list (>200) of body measurements and strengths
- Workshops, Interviews & Questionnaires to establish priorities.



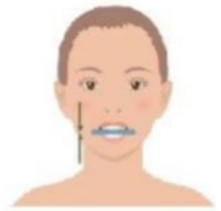
UPPER BODY/TRUNK STRENGTHS

WRIST STRENGTHS (TORQUE STRENGTHS)



HAND STRENGTHS

LEGS/FEET STRENGTHS



MOUTH STRENGTHS

Anthropometric & strength data of children in Europe

Key specifications of the measuring program

- Age range: 0-16 years old.
- Extended list of anthropometric measurements and strengths.
  - 0-3 yo: 93 anthropometry and 6 strengths.
  - 4-16 yo: 186 measurements and 14 strengths.
- Representative distribution of sample size.
- Two European countries: Spain and Netherlands.

Table 4 – Overview on list of measures

Age range *years*	Standing /supine *amount*	Sitting *amount*	Reaches *amount*	Head *Amount*	Hand *amount*	Foot *amount*	Strengths *amount*
0-3	13	11*	4	17	26	22	6
4-16	88	16	14	17	29	22	14

		Sample size of strength measures	
		BOYS	GIRLS
Sampling groups	≥ 2 year to < 3 years	60	60
	≥ 7 year to < 8 years	70	70
	≥ 11 year to < 12 years	70	70
	≥ 13 year to < 14 years	70	70

		Sample size of anthropometric measures							
		BODY MEASURES		HEAD MEASURES		FOOT MEASURES		HAND MEASURES	
		BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS	BOYS	GIRLS
Sampling groups	≥ 3 months to < 6 months	60	60	40	40	40	40	45	45
	≥ 6 months to < 9 months	60	60	40	40	40	40	45	45
	≥ 9 months to < 12 months	60	60	40	40	40	40	45	45
	≥ 1 year to < 2 years	60	60	40	40	40	40	45	45
	≥ 3 year to < 4 years	75	75	40	40	40	40	45	45
	≥ 5 year to < 6 years	75	75	40	40	40	40	45	45
	≥ 7 year to < 8 years	75	75	40	40	40	40	45	45
	≥ 9 year to < 10 years	105	105	40	40	40	40	60	60
	≥ 11 year to < 12 years	105	105	40	40	40	40	60	60
	≥ 13 year to < 14 years	105	105	40	40	40	40	60	60
	≥ 15 year to < 16 years	105	105	40	40	40	40	60	60

Anthropometric & strength data of children in Europe

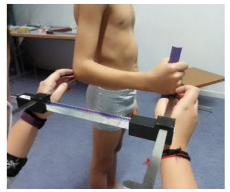
Manual Anthropometry

0 – 2 years old

Anthropometric & strength data of children in Europe

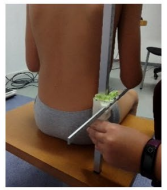
REACH (11)

Anthropometer

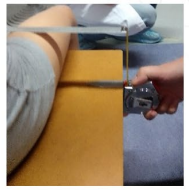


Sliding Caliper

SITTING (11)



Anthropometer

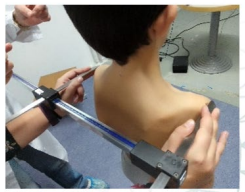


Segmometer

STANDING

Tape Measure

Abdominal Caliper

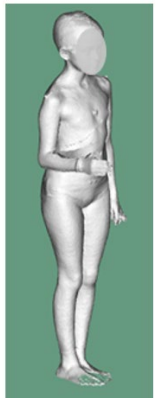


Sliding Caliper

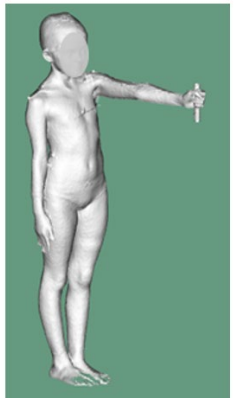
FOOT

HAND

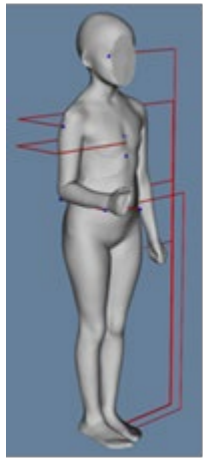
BIP_FUNCTIONAL

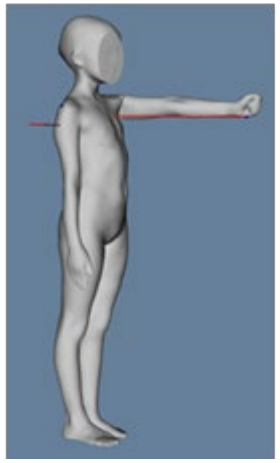


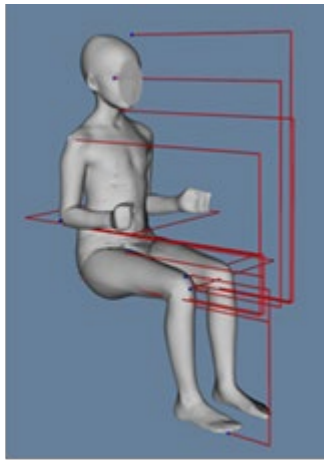
BIP_REACH



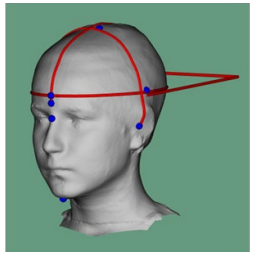
SIT_FUNCTIONAL







HEAD



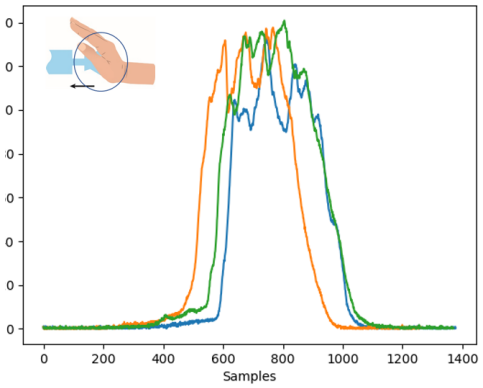
Anthropometric & strength data of children in Europe

Station: Frame & wireless sensors

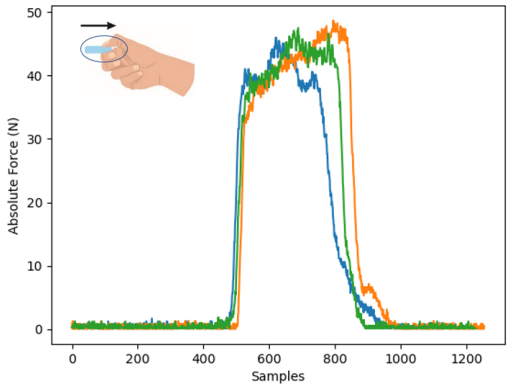
Minimal structure of steel to have enough robustness to prevent vibrations and deformations. Composed by:

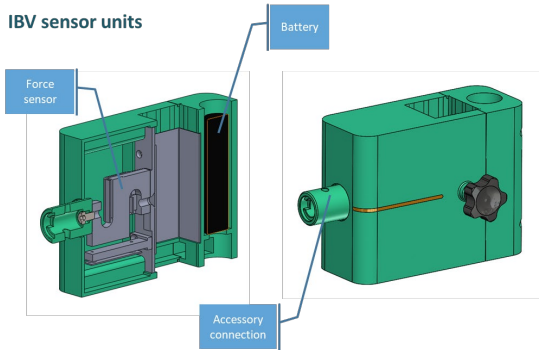
- Four sensors units: two for traction forces, one for compression, one for torques. The unit includes the load cell, battery and Bluetooth connection.
- Two additional commercial sensors.
- A set of accessories to perform the strengths.

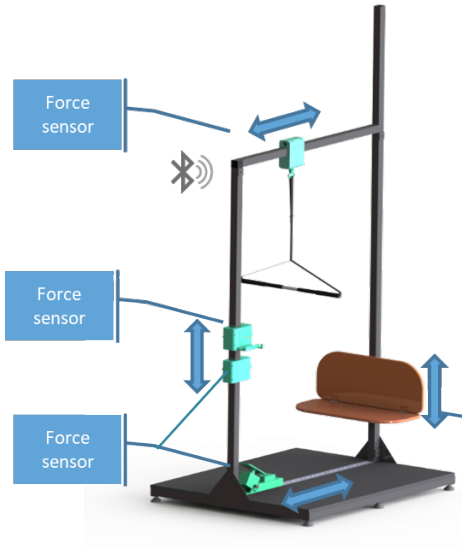
forceHandPushing

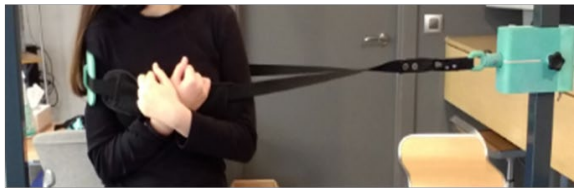


forceFingerPinchPull



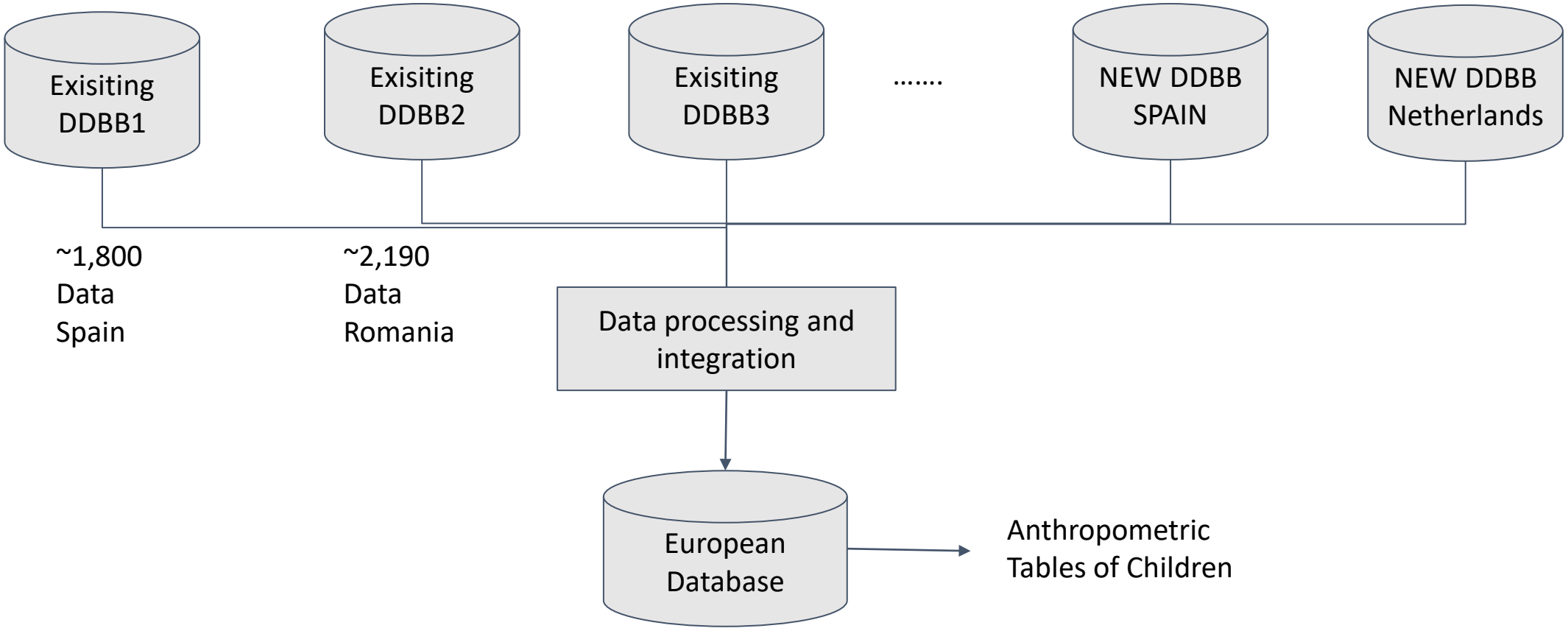






Anthropometric & strength data of children in Europe

- Algorithms for the harmonization of anthropometric data removing the bias among the different acquired databases.



Development of guidelines for the correct application of anthropometric and strength data

Children anthropometry

Short overview

Christiane Scheffler U Potsdam
Norbert Vogt U Kiel
Gerd Küchmeister Kiel UAS

CEN/TC 122/WG 1

Workpackages (…)

- application demands user groups / stakeholders
- presentation of survey data plus transfer information for application cases
- special content for risks in unknown application cases

Guidelines

the user driven approach

User groups / stakeholders:

- standardizers
- designers / product evaluators / safety engineers
- scientists / statisticians
- laypersons

Transfer data
biomechanical / physiological interaction

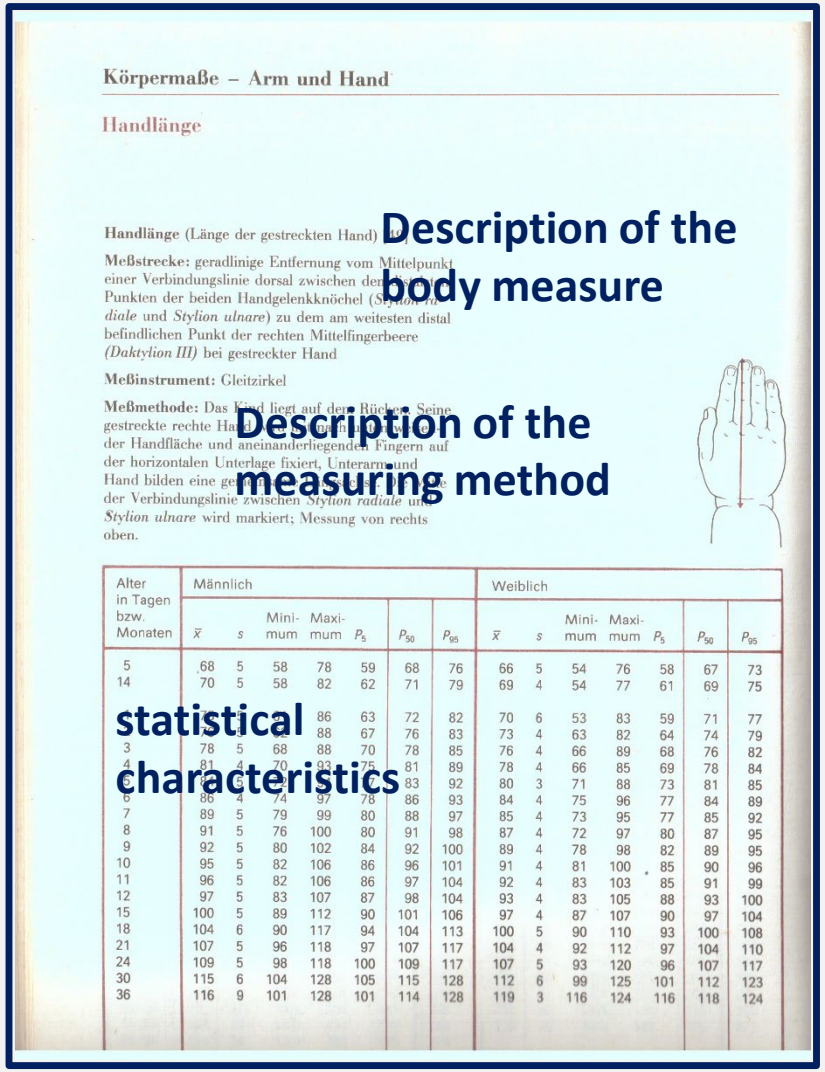
Core data – sociodemographic, sample, percentiles, statistical infos

Transfer data
interface interaction

Application influence factor(s)

- Measuring point to point
  - body joint(s) within the measuring section
  - hairs, nails

- Proportions
- Sexual dimorphism:
  - skeleton differences
  - body fat distribution
  - compressible soft tissue



Körpermaße – Arm und Hand

Handlänge

Handlänge (Länge der gestreckten Hand) [illegible]

Meßstrecke: geradlinige Entfernung vom Mittelpunkt einer Verbindungslinie dorsal zwischen den [illegible] Punkten der beiden Handgelenkknöchel (*Stylion radiale* und *Stylion ulnare*) zu dem am weitesten distal befindlichen Punkt der rechten Mittelfingerbeere *(Daktylion III)* bei gestreckter Hand

Meßinstrument: Gleitzirkel

Meßmethode: Das [illegible] der Handfläche und aneinanderliegenden Fingern auf der horizontalen Unterlage fixiert, Unterarm und Hand bilden eine ge[illegible] der Verbindungslinie zwischen *Stylion radiale* und *Stylion ulnare* wird markiert; Messung von rechts oben.

Description of the body measure

Description of the measuring method

statistical characteristics

Alter in Tagen bzw. Monaten	Männlich							Weiblich						
	$\bar{x}$	s	Minimum	Maximum	P_5	P_{50}	P_{95}	$\bar{x}$	s	Minimum	Maximum	P_5	P_{50}	P_{95}
5	68	5	58	78	59	68	76	66	5	54	76	58	67	73
14	70	5	58	82	62	71	79	69	4	54	77	61	69	75
[illegible]	[illegible]			86	63	72	82	70	6	53	83	59	71	77
[illegible]	[illegible]			88	67	76	83	73	4	63	82	64	74	79
3	78	5	68	88	70	78	85	76	4	66	89	68	76	82
4	81	4	70	93	75	81	89	78	4	66	85	69	78	84
[illegible]	[illegible]			[illegible]		83	92	80	3	71	88	73	81	85
6	86	4	74	97	78	86	93	84	4	75	96	77	84	89
7	89	5	79	99	80	88	97	85	4	73	95	77	85	92
8	91	5	76	100	80	91	98	87	4	72	97	80	87	95
9	92	5	80	102	84	92	100	89	4	78	98	82	89	95
10	95	5	82	106	86	96	101	91	4	81	100	85	90	96
11	96	5	82	106	86	97	104	92	4	83	103	85	91	99
12	97	5	83	107	87	98	104	93	4	83	105	88	93	100
15	100	5	89	112	90	101	106	97	4	87	107	90	97	104
18	104	6	90	117	94	104	113	100	5	90	110	93	100	108
21	107	5	96	118	97	107	117	104	4	92	112	97	104	110
24	109	5	98	118	100	109	117	107	5	93	120	96	107	117
30	115	6	104	128	105	115	128	112	6	99	125	101	112	123
36	116	9	101	128	101	114	128	119	3	116	124	116	118	124

Application influence factor(s)

- clothing
- **body protective equipment**
- body supporting system / technical environment
- body near / body integrated fashion items

Interaction between body supporting or protective systems or elements of the technical environment (**safety, comfort, efficiency**)

PPE: influence of anthropometric data on thermophysiological processes, e.g. sweating patterns.

Application example

Human modelling - usability Dummies in for comparing product tests

(data to be actualized)

Call for voluntary contribution from CEN & CENELEC experts

What

- Help validate the methodology developed and tested by the study → Check the standards identified and confirm the implication of anthropometrics in their content

Who

- TCs that develop hENs under the 22 legislations under scope of study are invited to support the exercise on a voluntary basis (list of hENs annexed)

When

- Deadline = End of June 2023

How

- Get in touch with Frauke.HOSS@ec.europa.eu or dwautier@cencenelec.eu

Key Take Aways

1. **Inclusiveness is a core value** of the CEN and CENELEC Standardization System
2. Inclusive standards **benefit ALL**: D&I make for higher quality standards that protect everyone & reach greatest market acceptance
3. Assume **ALL** standards have possible individual-implications
4. **CEN and CENELEC Experts have a role to play**
   - ✓ Use tools, guidelines & checklists
   - ✓ Use of representative data
   - ✓ …
   - ✓ and **Contribute to the DG GROW Study**

Your Contact point for Diversity & Inclusion

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Thank you for your participation!

Upcoming events

2023-05-16 - Webinar 'The functioning of the HAS system, interactions with HAS consultants and best practices'

2023-05-26 - Webinar 'Standardization Request for the Machinery Regulation, a smooth transition'

2023-06-08 – Stakeholder Workshop 'Standards: Driving the future of CleanTech in Europe'