

Development of an assessment method for the slip resistance of flooring and pedestrian surfaces

SLIPRESISTANCE Project (GA N°101196460)

Workshop, September 16th, 2025

Objective

- The SLIP-RESISTANCE Project
- 2024 CPR key criteria
- WP2. State of the art analysis. Results
- Discussion
- Proposal

The SLIP-RESISTANCE Project



Single Market Programme
(SMP Standardisation)

Call for proposals - Invitation to submit a
proposal

Support to Standardisation activities performed by CEN, CENELEC and
ETSI

SMP-STAND-2024-ESOS-01-IBA

Version 1.0
21 March 2024

Topic 19 SMP-STAND-2024-ESOS-01-IBA

Development of an assessment method for the slip
resistance of flooring and pedestrian surfaces

The **standard** shall provide an efficient approach to the testing of
floorings and other surfaces **reducing the cost** and enhancing their
application to **all types of persons**. It should also provide **statistical
results correlating** the test results and the incidence of accidents in
real case situations.

Test labs able to perform the **test** should be involved in the work
together with **regulators** in charge of safety **building codes** and
specific **research institutions** able to assess **real life accidents** in
relation to slip resistance both indoor and outdoor.

The methodology shall follow the **performance-based approach**
and provide **a testing system** which will be **material independent**
and applicable to the current and future materials used for the
manufacturing of these products.



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Expected impact

The project will improve the competitiveness of the industry and support innovation by facilitating the improvement of floorings. It will also result in an **increase in safety due to harmonisation of methods** and the link to specific real life situations.

The overall result will be an improvement of the pedestrian safety in Europe and will reduce the gender gap in this field.

Stakeholders

Direct participants: Standardisation bodies, Test labs, Research institutions
[with tasks in the project]

Leads: UNE

Coordination: IETcc-CSIC

Others: Regulators

Other contributions

Call for contribution to the Project, **special interest:**

- National regulations
- Accidents data
- Jurisprudence
- Relevant scientific literature

Objective

Produce a **quality assessment method** for the slip resistance of pedestrian floorings as support of the related EU legislation and construction product manufacturing: **an evolution of EN 16165**

Based on the Article 114 of the Treaty on the Functioning of the European Union (TFEU): remove obstacles to the circulation of construction products within the single market.

~~4 tests: A, B, C, D~~



A unique test method
(material independent,
correlated with accidents,
economical, etc.)

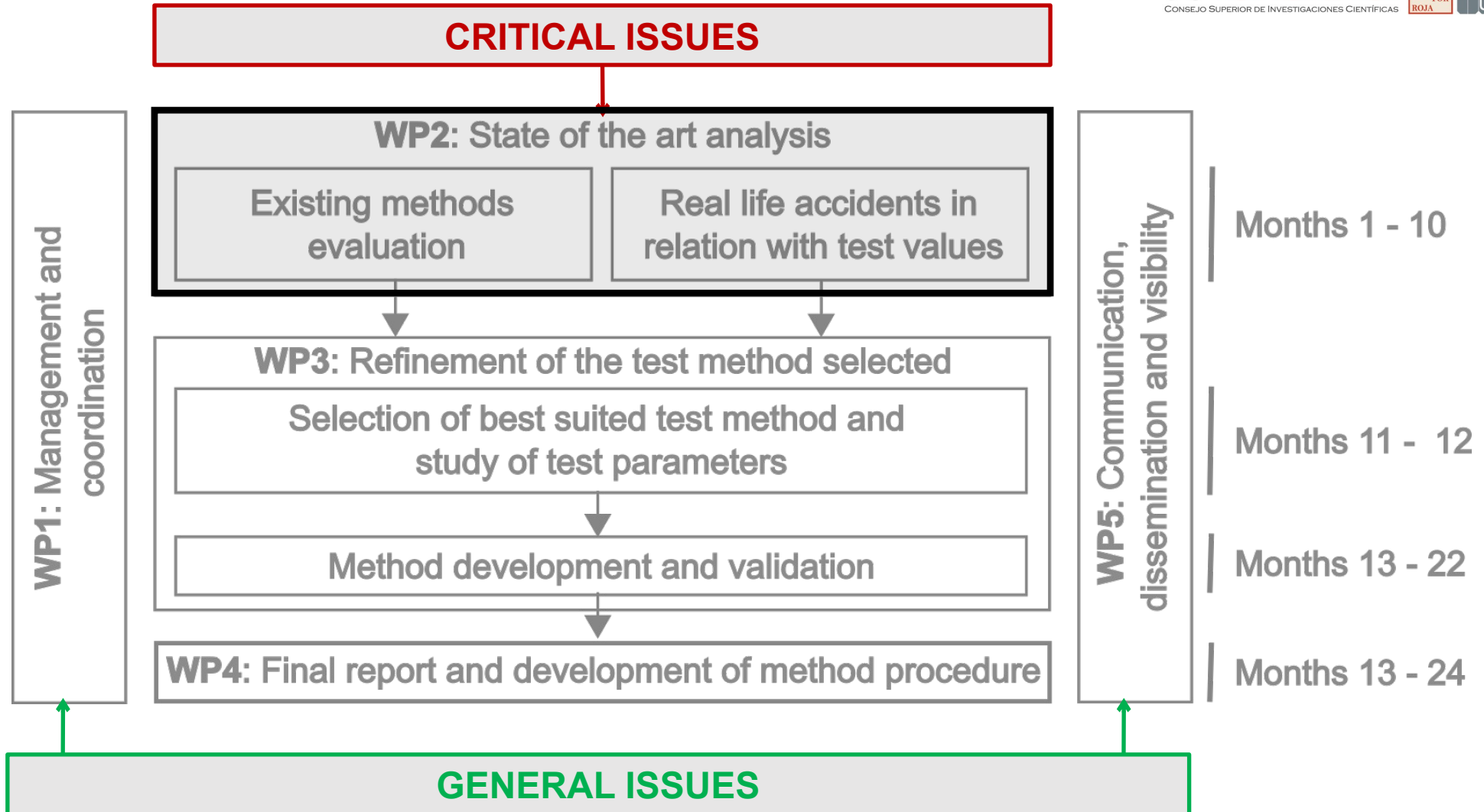
CPR Acquis – GLA – Inputs provided by CEN and meeting 26.05.2025

2.7 Regulatory provisions by Member States which required additional discussions

Products in Table are included in this product group.

Table 4 List of national regulatory provisions which require additional discussions

State code and type of provision	Identification and nature of the provision	Construction product	Intended use(s)	Technical data requested (Threshold levels, classes or any other required data on the product)	Additional information / remarks
SPAIN - A.1	CODIGO TECNICO. Slip resistance of pedestrian surfaces, obtained with the pendulum test. Reference standard is EN 16165:2021, Annex C but with the addition of a Spanish National Annex	Glass used as floor	Floor or walkable roof	Slip resistance of roof windows / potentially also on glazed floors	Never tested for glass alone so far. Problem: EN 16165 has 4 <u>methods</u> and Spain adds a national annex
FRANCE - A.1	RT 2020 (thermal	All glazing used in the building	Façade, roof	Solar factor with other boundary conditions:	Cannot be used in other countries. Currently given separately



2024 CPR key criteria. Harmonised zone

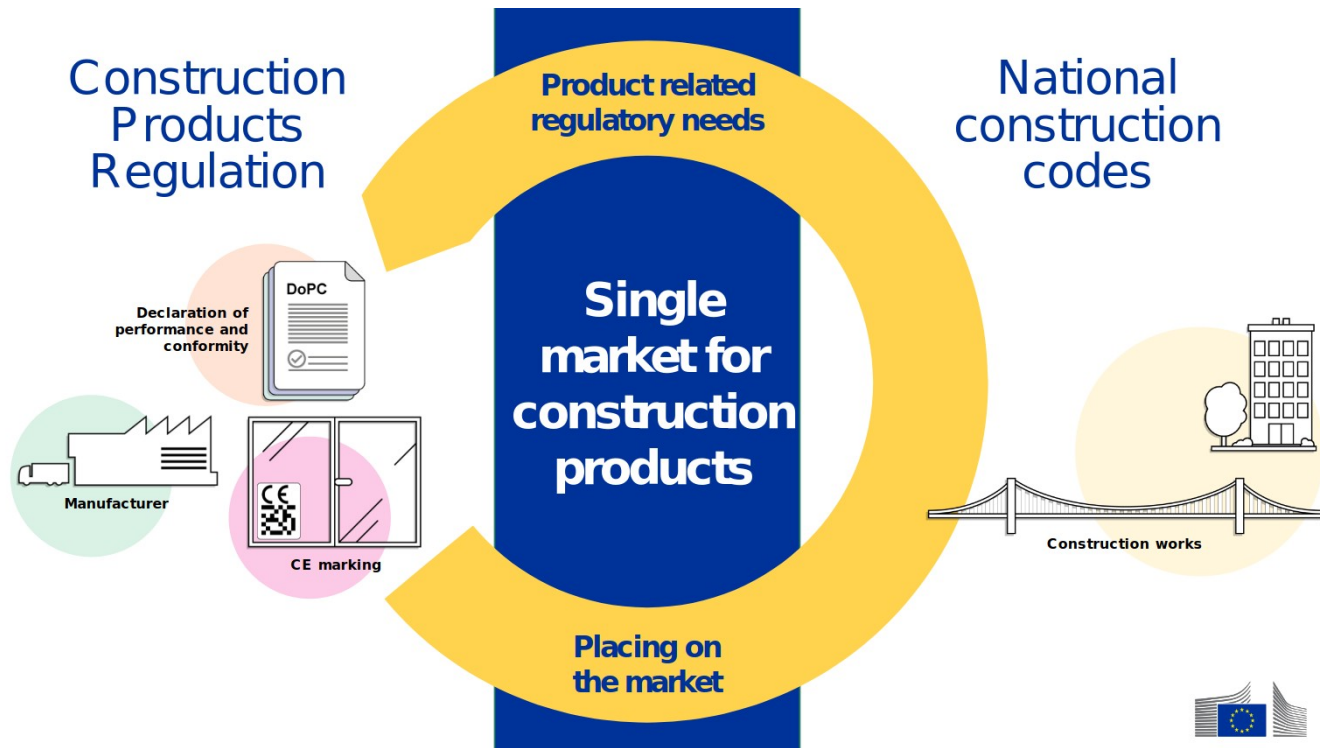
What is the CPR?

Construction products

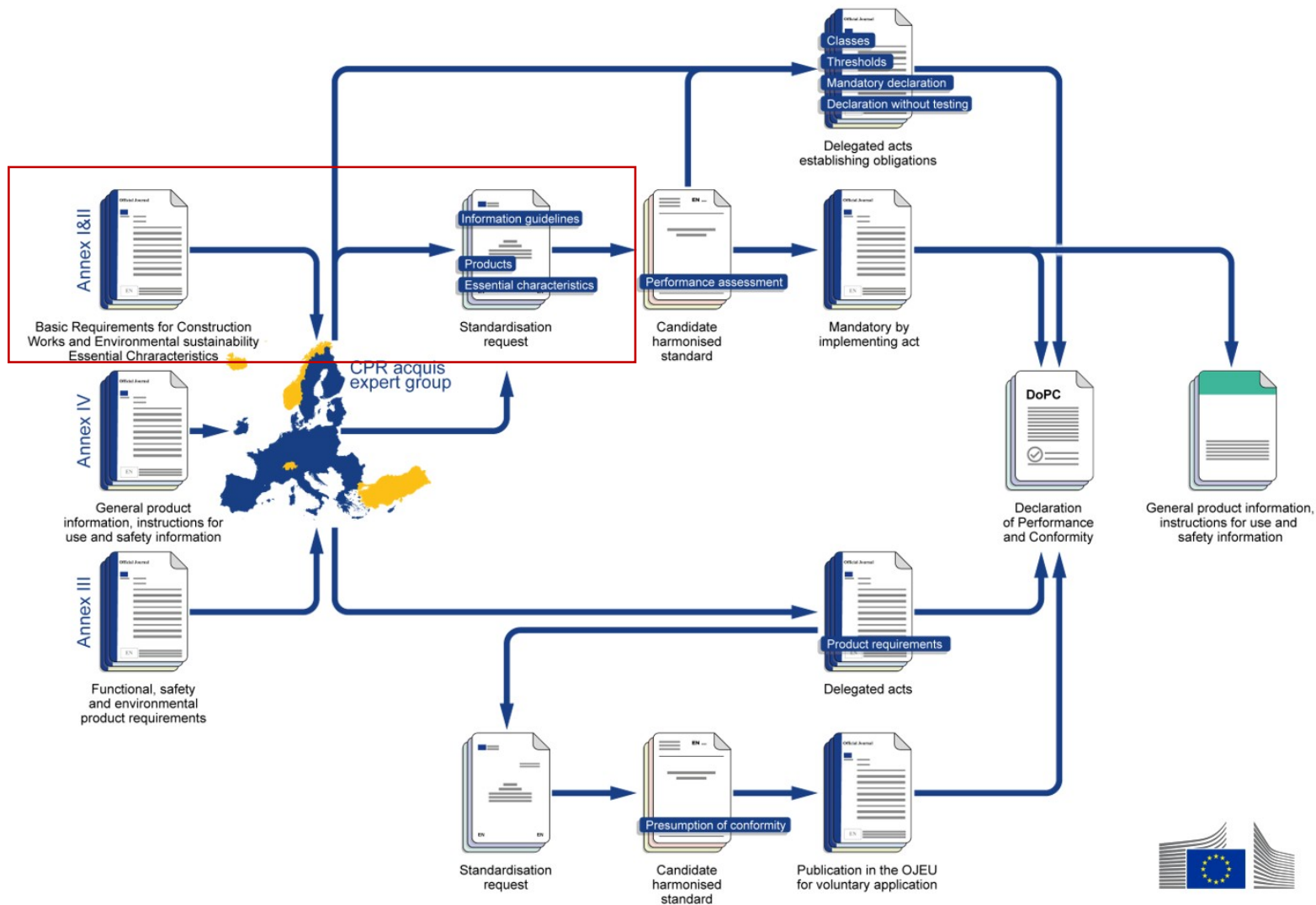
- Harmonised rules
- Single market
- Free movement of products (CE marking)
- Common technical language
- Digital Product Passport

National Building Codes

- Construction works



CPR

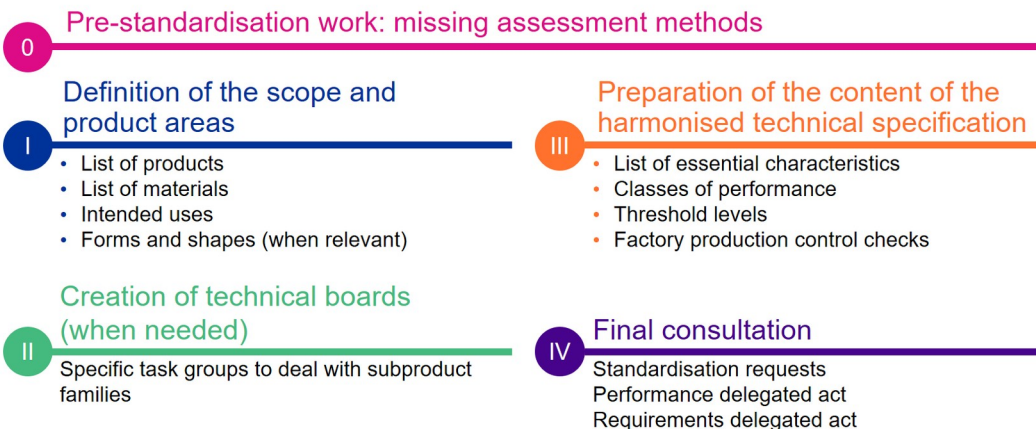


CPR Acquis Expert Groups - priorities

Fire Dangerous substances Environmental sustainability	1 Precast normal/ lightweight/ autoclaved aerated concrete products 1	17 Masonry and related products - Masonry units, mortars, and ancillaries 9	5 Structural bearings - Pins for structural joints 17	7 Gypsum products 25	6 Chimneys, flues and specific products 33
	20 Structural metallic products and ancillaries 2	24 Aggregates 10	34 Building kits, units, and prefabricated elements 18	33 Fixings 26	32 Sealants for joints 34
	16 Reinforcing and prestressing steel for concrete - Post-tensioning kits 3	10 Fixed fire fighting equipment 11	21 Internal & external wall and ceiling finishes, linings, partition kits 19	3 Membranes, including liquid applied and kits 27	35 Fire stopping, sealing and protective products - Fire retardant products
	2 Doors, windows, shutters, gates and related building hardware 4	23 Road construction products 12	27 Space heating appliances 20	30 Flat glass, profiled glass and glass block products 28	29 Construction products in contact with water intended for human consumption
	15 Cement, building limes and other hydraulic binders 5	19 Floorings 13	22 Roof coverings, roof lights, roof windows, and ancillary products - roof kits 21	8 Geotextiles, geomembranes, and related products 29	36 Attached ladders
	4 Thermal insulation products - Composite insulating kits/systems 6	4 Thermal insulation products - Composite insulating kits/systems 14	12 Circulation fixtures, road equipment 22	11 Sanitary appliances 30	# Paints
	13 Structural timber products/elements and ancillaries 7	9 Curtain walling/cladding/structural glazing 15	18 Wastewater engineering products 23	28 Pipes-tanks and ancillaries not in contact with water for human consumption 31	
	26 Products related to concrete, mortar and grout 8	14 Wood based panels and elements 16	25 Construction adhesives 24	31 Power, control and communication cables 32	

	Horizontal subgroups
	Standardisation request adopted
	CPR Acquis ongoing work
	CPR Acquis not started yet
	Fast track ongoing
1	Priority

CPR acquis process – Milestones

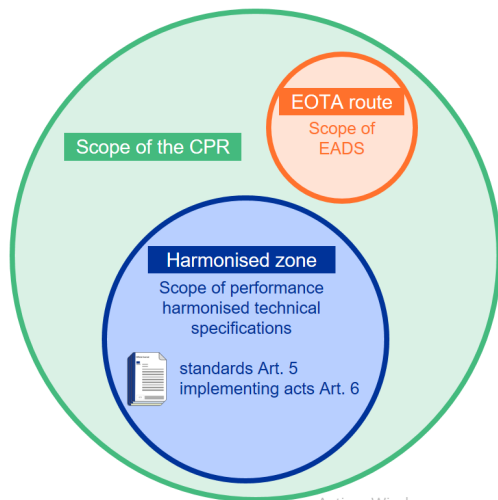


Harmonised zone

All products which are in the scope of a performance harmonised technical specification

The scope must be clear

Products outside the harmonised zone can be voluntarily CE marked following the EOTA route



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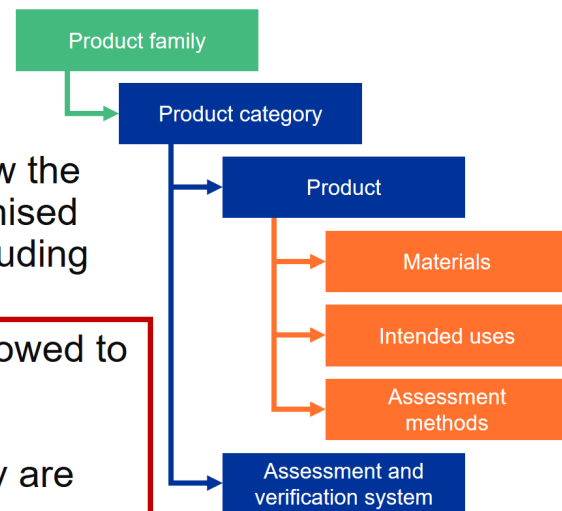


Article 11

Harmonised Zone

Member States must follow the rules set out in the harmonised technical specification including third party tasks.

Member States are not allowed to have additional rules or requirements for product characteristics or how they are assessed.



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For products within the harmonised zone,
Member States can...



- Establish minimum performances for all or certain applications
- Require more ambitious thresholds
- Specify national requirements for the use of products
- Decide that some performances are not required

 Article 11(2) & 11(3)

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For products within the harmonised zone,
Member States cannot...



- Require a different assessment method for the declaration
- Demand different third-party tasks to those defined by the CPR
- Require additional essential characteristics not included in the harmonised standard

 Article 11(2) & 11(3)

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Summarising, SLIP RESISTANCE as “essential characteristic” for flooring products:

- if NO : Member States cannot require any slip resistance requirement to flooring products
- if YES : Member States can only require the essential characteristic/s and the assessment method/s harmonised to flooring products

CEN-CENELEC. GUIDE 36

Guidance on the rules for drafting and presentation of candidate harmonized product standards for construction products. Edition 1, 2020-06

4.10 Clause 5 “Testing, assessment and sampling methods”

All construction product characteristics included in Clause “Characteristics”, intended to be declared, shall be subject to verification by test, assessment, calculation methods and/or by using tabulated values, to be given in Clause “Testing, assessment and sampling methods”, choosing the less onerous method (see CEN-CENELEC Guide 17, subclause 5.4.4). This can be given by a specific subclause here, or by reference to an ISO/IEC or CEN/CENELEC Standard (supporting standards).

Preferably only one method of a particular type (test method, calculation method or deemed to satisfy method) should be referred to for the determination of each characteristic, for a given construction product or family of construction products.

The only exception to this is where the standard gives provisions for declaring the performance related to a specific construction product characteristic without the need of performing tests/assessments/calculations because covered by deemed to satisfy provisions, conventionally accepted performance, classified without testing (CWT), established by EC Decisions or delegated acts.

If two or more test or calculation methods for the determination of one characteristic can be used and if a correlation between them exists, the relevant harmonized product standard must then select one of them as the method of reference.

If, however, for a construction product or family of construction products, more than one method is to be referred to for the determination of the same characteristic, the situation must be justified in the standardization request or answer/revised answer to the mandate and accepted by the European Commission in writing. In this case, all referenced methods should be linked by the conjunction “or” and an indication of application should be given.

Verification methods (testing, assessment and/or calculation) shall have, whenever possible, a horizontal character covering the widest possible range of construction products, and the possibilities for multiple verification methods should be dealt with on a case-by-case basis.

Test, assessment, calculation methods shall be written so that they can be used by anybody (first, second or third party) on any construction product sample. The reference method should be used for the Type testing/Product type determination. The alternative test method with demonstrated correlation with the reference method might be used for the Factory Production Control (FPC). Where appropriate, tests, assessment, calculation methods may be identified to indicate whether they are intended:

- for assessment of performance purposes;
- for the FPC purposes;
- for audit purposes.

The results of tests, assessment and calculation to be expressed in the test report and or manufacturer's record shall be detailed in this clause.

Provisions regarding the sampling are to be stated for each test/assessment method included in this clause of the candidate hEN, unless they are included in the separate standard where the test/assessment method is given (supporting standards referred to by a cross-reference).

Sampling provisions can include the following:

- place of sampling (production line, stockyard in the plant, etc.);
- size and number of samples;
- any statistical method to be applied;
- details to be included in the sampling report.

The setting of sampling levels shall not discriminate between manufactures’

1 “assessment method” for each “essential characteristic”

If more of 1 methods (justified) : indication of application for each method or correlation between them

CEN-CENELEC. GUIDE 17

Guidance for writing standards taking into account micro, small and medium-sized enterprises (SMEs) needs. Edition 1, June 2010

5.4.4 Testing

Avoid imposing costly and complex testing regimes and consider the frequency of testing.

The required tests for compliance with standards are often a significant financial burden for small manufacturers. This includes the costs of measuring equipment, staff training, time and resources necessary to perform the tests. Small enterprises usually do not produce on mass scale and their products may have specific characteristics. Imposing a high number of tests significantly increases the price of their products.

It has to be noted that standards should not introduce any unnecessary tests. That is to say, a presumption should be made that, in the event of doubt based on the adequacy and necessity of a given test method, it should not be added to the existing test regime.

The standard writers should check who can perform any given test and avoid as far as possible favouring a test that leads to or reinforces monopolistic or dominant positions.

5.4.5 Verification methods

Identify simple and cost-effective ways of verifying conformity with the requirements.

In order to allow flexibility in verification of requirements, alternative methods including calculations and tabular methods for the assessment should be taken into account whenever possible.

In addition, standard writers need to ensure that the results of the tests described in standards are unambiguous. It is vital for small manufacturers that standards refer to methods which cannot be undermined by parties with partial interests.

WP2. State of the art analysis. Results

Objectives. Summary

1--- National regulatory requirements

- Scenarios – slip resistance scenarios defined in national regulations (indoor and outdoor, shod and barefoot, contaminants) and the assessment methods

2 --- Test methods included in EN 16165

- Cost-efficiency – Method that helps reduce overall testing costs.
- Flooring performance / Performance-based approach – Method that includes the evaluation of flooring performance over its lifespan (wear, accidents, etc.), such as through on-site testing procedures.
- Accuracy – Method offering reliable test accuracy (repeatability and reproducibility).
- Material independence – Method applicable to current and future floorings, regardless of the material.
- Gender gap – Method not dependent on specific user characteristics.

3 --- Real life accidents in relation to test values

- Correlation between accidents and test results – Based on statistical data linking test outcomes with accidents in real-world scenarios.

Slip resistance regulatory implications for EU member states

CONSULTATION CONTEXT

Action grants (SMP-STAND-2024-ESOS-01-IBA) under the Standardisation strand of the Single Market Programme continue to support the standardisation activities of the European Standardisation Organisations: CEN, CENELEC and ETSI.

Topic 19: Development of an assessment method for the slip resistance of flooring and pedestrian surfaces.

https://eismea.ec.europa.eu/funding-opportunities/calls-proposals/support-standardisation-activities-performed-cen-cenelec-and-etsi-2_en

TARGET GROUP

National regulators involved in building, workplace and urban planning requirements.

The objective of the SLIP-RESISTANCE Project (GA N°101196460) is to develop a new assessment method for the performance of floorings as regards their slip resistance. The proposed methodology will support harmonised standards under Regulation (EU) 305/2011 - Construction Products Regulation (CPR) when establishing essential characteristics on safety in use (slipperiness) for the products concerned in pedestrian surfaces.

Therefore, the purpose of this query is to obtain information of National Regulations and other data related to real life situations, such as accidents, jurisprudence, etc., useful information necessary for the development of an assessment method for the slip resistance of flooring and pedestrian surfaces.

QUESTIONS. Slip resistance Regulations of pedestrian surfaces/floorings

Q.1 Does your country have regulations (national, regional, local) which concern slip resistance for pedestrian floorings in buildings, workplaces or urban areas?

Q.1.1 If yes, please provide legislation or code references

Q.1.2 If yes, please provide the test method for assessing this safety performance and/or the relevant standard involved.

Q.1.3 If no, does your country have recommendations/guidance to support this characteristic?

Q.2. As a regulator, what do you need to regulate or improve the slip resistance regulation?

DATABASES on accidents and jurisprudence related to slip resistance

The evaluation of the methodology would require access to databases or contact with institutions that can provide accident data, jurisprudence or scientific literature related to these matters. If possible Could you provide us with databases or institutions that we could contact to obtain them?

National regulatory requirements. Consultation

--- Regulators participating in the AQCUIIS group of floorings

--- 14 EU responses (13 from MS):

Austria

Denmark

France

Greece

Luxembourg

Slovenia

Sweden

Belgium

Finland

Germany

Hungary

Portugal

Spain

Switzerland

National regulatory requirements. Results

- **Generally, unquantified regulatory requirements** (risk for pedestrians not for vehicles):

Building regulations: *“The surface should be slip resistant” [and] in dry and in wet” [or] “especially when wet”*

Urban planning: *“The surface should be slip resistant” [in wet]*

Health and safety regulations: *“The surface should be slip resistant” [risk assessment]*

- **Currently,** *“test in harmonised standards is material-dependent, test results are not comparable”*

- **A quantified regulated requirement in National Regulations**, other than a harmonised standard, observed in:

GERMANY (workplaces + barefoot areas, in buildings); **ITALY** (dry/wet normal use, in residential buildings);

SLOVENIA (in swimming pools); **SPAIN** (dry/wet normal use + barefoot areas, in buildings + urban areas)

- **Some national regulators demand:**

“Comparable test results to defining risk limit values accordingly.”

“In-situ test method (wear, accidents, on site floorings) in addition to laboratory method.”

“Method included in all the harmonised product standard.”

Harmonised standard	Product	Material	Test	Scenario	Rubber slider IRHD (ISO 48)
EN 1051-2:2007	Glass blocks and glass pavers	Glass	not defined		
EN 1338:2003	Concrete paving blocks	Concrete	Friction pendulum	wet conditions	53 a 65
EN 1339:2003	Concrete paving flags	Concrete	Friction pendulum	wet conditions	53 a 65
EN 1340:2003	Concrete kerb units	Concrete	Friction pendulum	wet conditions	53 a 65
EN 1341:2012 (test procedure in EN 14231:2003)	Slabs of natural stone for external paving	Natural stone	Friction pendulum	wet conditions	53 a 65
EN 1342:2012 (test procedure in EN 14231:2003)	Setts of natural stone for external paving.	Natural stone	Friction pendulum	wet conditions	53 a 65
EN 1343:2012	Kerbs of natural stone for external paving	Natural stone	not defined		
EN 1344:2013 (test procedure CEN/TS 16165:2012-annex C)	Clay pavers	Clay	Friction pendulum	wet conditions	Slider 57
EN 12057:2004	Natural stone products- Modular tiles	Natural stone	Friction pendulum	wet/dry conditions	53 a 65
EN 12058:2004 (test procedure in EN 14231:2003)	Natural stone products- Slabs for floors and stairs	Natural stone	Friction pendulum	wet/dry conditions	53 a 65
EN 13748-1:2004	Interior terrazzo tiles	Terrazzo	Friction pendulum	wet conditions	53 a 65
EN 13748-2:2004	Exterior terrazzo tiles	Terrazzo	Friction pendulum	wet conditions	53 a 65
EN 14041:2004 (test procedure in EN 13983:2002)	Resilient, textile and laminate floor coverings	Resilient, textile and laminate	Dynamic friction testing	dry and non-contaminated conditions	2 leather sliders +1 rubber slider (Shore A hardness 95, EN 522:1998)
EN 14342:2013 (test procedure in CEN/TS 15676:2007)	Wood flooring and parquet	Wood	Friction pendulum	dry conditions	53 a 65
EN 14411:2012 (test procedure CEN/TS 16165)	Ceramic tiles	Ceramic	The test method and results shall be declared as given therein		
EN 14904:2006 (EN 13036-4)	Surfaces for sports areas	Generic	Friction pendulum	dry conditions	55 a 61 Slider 57 (CEN rubber)
EN 15285:2008 (test procedure in EN 14231:2003)	Agglomerated stone - Modular tiles for flooring and stairs (internal and external)	Agglomerated stone	Friction pendulum	wet/dry conditions	53 a 65

EU test methods. CE-marking

Some EU member states: *“The slip resistance performance is defined by manufacturers according to applicable harmonised standards”*

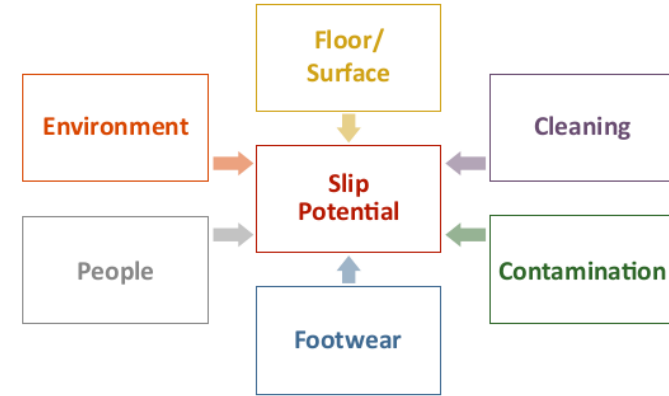
Problem detected by the European Commission: *“Test in harmonised standards is material-dependent, test results are not comparable”*

Calls for:

“Actually it is not possible to regulate slip resistance with values, since for all the different floorings, different test standards are used which cannot be compared (see harmonized standards). The main problem is, that there are test methods which can only be used in laboratories and others which are meant to be tested on site. Another (legal) problem is CE-marking, no additional values can be demanded (see CPR). In this respect, another question is how floorings can be dealt when are „built“ on site.”

National regulatory requirements. SCENARIOS identified

**Factors contributing to slip accidents
(simplified model):**



- OCUPATIONAL RISKS**
- Risk assessment for specific ocupacional scenarios (e.g. industrial use)
 - Specific work conditions (specific work shoes, contaminants, cleaning, etc.)
- NORMAL USE**
- Floor contribution to slips (general private/public buildings, urban areas)
 - Standard conditions (dry/wet, normal shoes/barefoot, normal user behavior, etc.)

Project partners

IETcc-CSIC	(Coordinator)
ITC	(TC339 member)
LUCIDEON	(TC339 member)
DGUV	(TC339 member)
TCKI	(TC339 member)
Laboratorio Resbaladicidad	(Lab.)
CT Marmol	(Lab.)
CT Granito	(Lab.)
LOEMCO	(Lab.)

Test methods included in EN 16165 & Real life accidents in relation to test values. Documentation for the analysis

--- **Partners** participating in the **SLIP-RESISTANCE** project

--- **Compilation** of the following items for each test methods considered in EN 16165:

- Cost-efficiency
- Flooring performance
- Accuracy
- Material independence
- Gender gap
- Real life accidents in relation to test values

The pendulum friction test. Results

--- **SCENARIOS:** The method is adjusted for measuring dry and wet (water) conditions, these are the most common risk scenarios with user complaints (normal use). Barefoot scenarios can be characterised.

--- **ACCURACY:** Today, it is the only method in EN 16165 that guarantees sufficient accuracy (repeatability, reproducibility).

--- **TEST PROCEDURE:** The method is versatile (small testing area that allows testing in diverse directions and a uniform wear conditioning; laboratory and in situ test procedures to also determine the performance of floors manufactured on site)

--- **TRACEABILITY:** The method facilitates the traceability of results over time and can be used both to establish the performance of a floor during manufacture (in laboratory) and to evaluate in situ results in the event of wear or an accident, for example.

--- **MATERIAL INDEPENDENCE:** The method has been chosen by the harmonised European standards to provide slip resistance performance for different materials (except EN 13983). In addition, scientific literature shows that it is a suitable method for the largest number of surfaces. The EN 16165 defines a procedure for determining stable results on profiled surfaces.

--- **COSTS:** Test costs are reduced. Possibility of calibration, equipment and components available in many countries.

--- **RISK-ACCIDENTS:** Spain and UK provide risk scenarios and safe limits in dry and wet conditions (normal use) in relation to accidents.

--- LIMITS:

--- **SCENARIOS:** The method could be used with different contaminants, but it is only adjusted for normal use.

--- **TEST PROCEDURE:** It is not clearly defined in the EN 16165

The ramp test (barefoot, shod). Results

--- **SCENARIOS:** The method can be used experimentally with different types of footwear and contaminants, mainly workplaces and also in barefoot conditions.

--- **MATERIAL INDEPENDENCE:** Although it has not been used by harmonised standards, material dependence has not been observed. The main problem is the evaluation of smooth floors.

-- **RISK:** Germany provides risk scenarios in standardised workplaces and in wet barefoot areas.

--- LIMITS:

--- **SCENARIOS:** The workplace scenario is standardised, therefore this method loses representativeness in an assessment of occupational risks. Furthermore, it is not representative of normal/common use (water, normal footwear).

--- **ACCURACY:** Today, it does not guarantee sufficient accuracy (reproducibility-walkers).

--- **TEST PROCEDURE:** The method is limited (large test area that makes it difficult to perform tests in different directions and achieve uniform wear conditioning; not possible to determine the performance of floors manufactured on site)

-- **TRACEABILITY:** The method only allows the performance of a floor to be established during its manufacture (in laboratory), but not in situ. It is therefore necessary to test in parallel with another method to evaluate its performance in situ, for example, in the event of wear or an accident.

--- **COSTS:** Testing costs are higher. Calibration, equipment and components are expensive and hard-to-get.

--- **ACCIDENTS:** No data between risk limits and accidents has been obtained

The tribometer test. Results

--- **COSTS:** The method is the cheapest and staff training is less exigent.

--- **TRACEABILITY:** The method allows the performance of a floor in laboratory and in situ.

--- **RISK:** Germany provides risk scenarios in standardised workplaces.

--- **LIMITS:**

--- **ACCURACY:** Today, it does not guarantee sufficient accuracy (repeatability, reproducibility). Floors identified as unsafe by other tests are not classified as hazardous.

--- **TEST PROCEDURE:** Measurements can overestimate the actual slip resistance due to stick-slip effects on smooth surfaces. Measurements are impaired by loss of contact on structured and textured surfaces.

--- **SCENARIOS:** The method is limited to micro roughness/gritty surfaces.

--- **MATERIAL INDEPENDENCE:** The method is only used by EN 13983 harmonised standard to test in dry conditions. This method is limited to micro roughness/gritty surfaces.

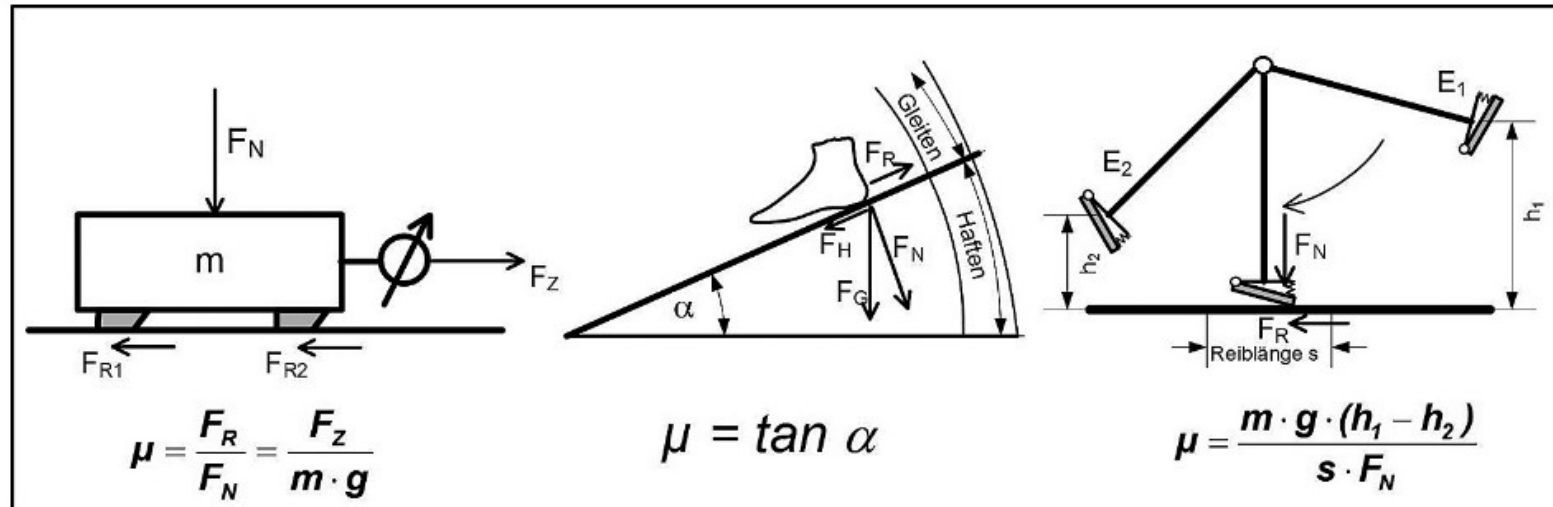
--- **ACCIDENTS:** No data between risk limits and accidents has been obtained

DISCUSSION

DISCUSSION

The main question of coming up with a single specific test method for testing the slipperiness of flooring materials is not reasonable or simple.

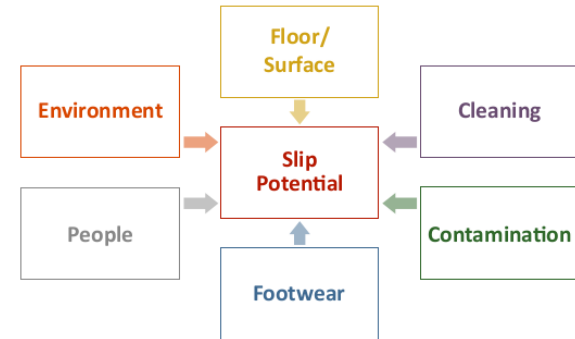
Many years of discussions, correlation studies and tests have been spent **trying to find one specific property for slipperiness**.



DISCUSSION

The slipperiness of a product depends on its application and on the person using it. The environment, the type of footwear, cleaning (or lack of cleaning), the people (their actions, friction requirements, ability or disability etc.), contamination and the floor itself will influence the slip risk.

**Factors contributing to slip accidents
(simplified model):**



OCUPATIONAL RISKS

- Risk assessment for specific ocupacional scenarios (e.g. industrial use)
- Specific work conditions (specific work shoes, contaminants, cleaning, etc.)

NORMAL USE

- Floor contribution to slips (general private/public buildings, urban areas)
- Standard conditions (dry/wet, normal shoes, barefoot, normal user behavior, etc.)

DISCUSSION

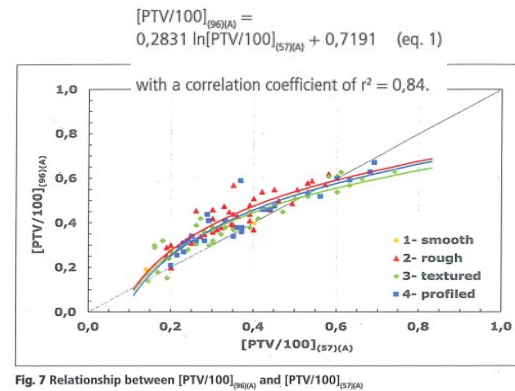
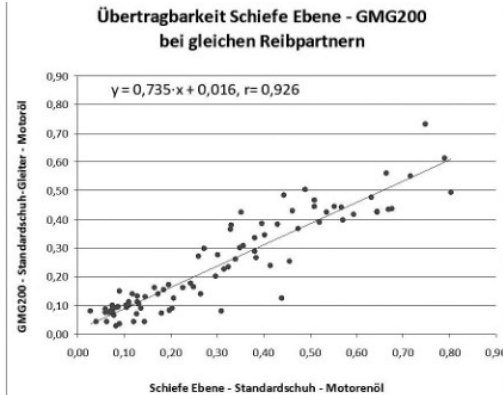
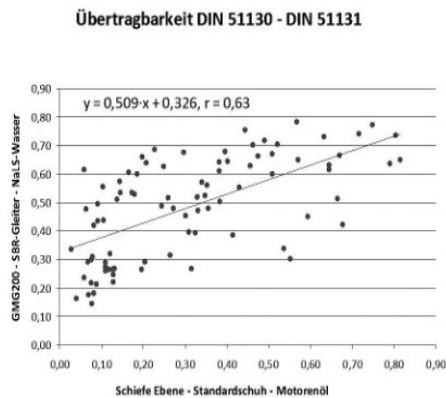
Application problems cannot all be solved by measuring the properties of the product alone. At the product level, various properties are needed to obtain a broad characterization of the product. The number of properties to be tested may also depend on the type of flooring product. For some products not all properties can be measured. For some products not every property has to be measured, because it is out of the intended use of the product.

Test methods	DCOF (FSC2000 - GMG 200)				
	DCOF measurements can overestimate the actual slip resistance due to stick-slip effects				DCOF measurements are impaired by loss of contact surface
	Ramp				
	Pendulum				Pendulum measurements are impaired by impact variation on profile
Surface	Pk < 50 µm Pp < 90 µm	Pk > 50 µm Pp > 90 µm	Pk > 100 µm Pp > 200 µm	Pk > 150 µm Pp > 300 µm	Pk > 300 µm Pp > 700 µm
SlipSTD	group 1 smooth	group 2 gritty, micro roughness	group 3 structured and textured		upper level group 3 profiled

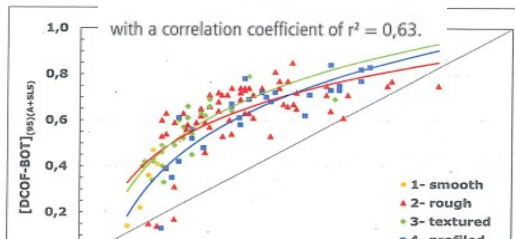
Fig. 4 Suitability of different slip test methods dependent on the surface characteristics

DISCUSSION

The simple overall conclusion is that there are different properties of slip-resistance depending on the application-area and use – also they are in the identic flooring-product. There is insufficient correlation between which is totally reasonable because of different properties. Therefore a good **correlation cannot be expected**. There is no preferred property.



$$[DCOF-BOT]_{(95)(A+SL5)} = 0,2939 \ln \left[\frac{PTV}{100} \right]_{(57)(A)} + 0,9322 \quad (\text{eq. 4})$$



$$[\tan \alpha]_{\text{barefoot}(A+SL5)} = 0,5609 \left[\frac{PTV}{100} \right]_{(57)(A)} + 0,1737 \quad (\text{eq. 5})$$

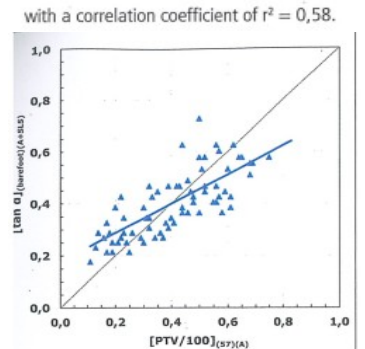
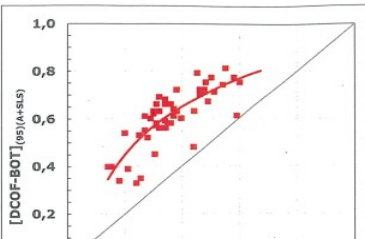


Fig. 15 Relationship between the values

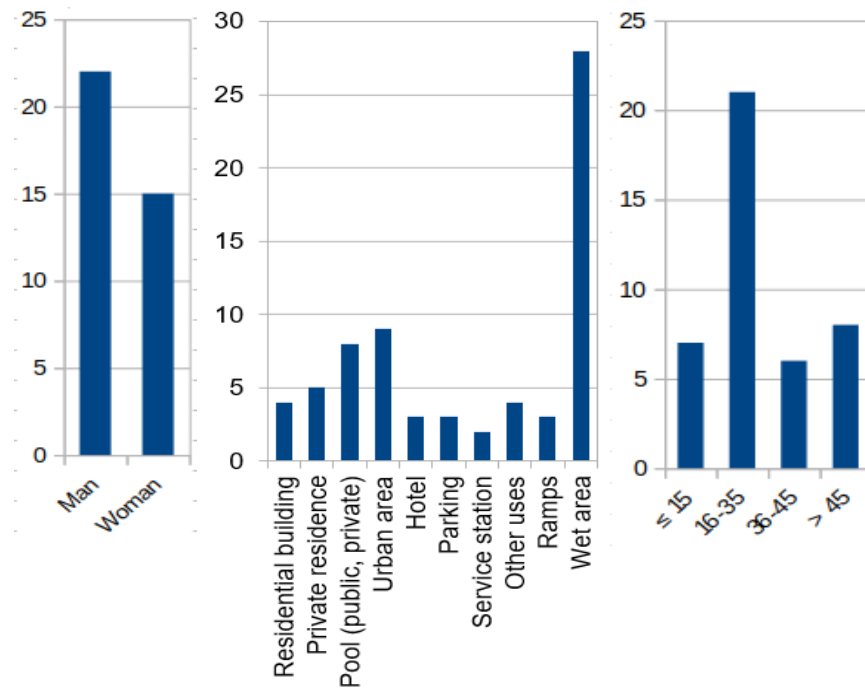


DISCUSSION

Each country has gained many years of statistical correlations of **specific test methods and their country's accident data**. It would be very difficult, if not impossible to get any country to agree to change their method of test, change building regulations and have to start gathering data again from scratch.

<https://www.mites.gob.es/es/estadisticas/anuarios/2022/index.htm>

WORK ACCIDENTS	Year	Totals	Minor	Serious	Fatal
Falling Persons – Slip or Trip and Fall	2022	113.498	112.047	1.370	81
Fall of a person - from a height		29.080	28.186	820	74
Fall of a person - to the same level		80.699	80.166	526	7
Falling Persons – Slip or Trip and Fall – Unspecified		3.719	3.695	24	0
Falling Persons – Slip or Trip and Fall	2021	110.767	109.290	1.395	82
Fall of a person - from a height		26.786	25.873	833	80
Fall of a person - to the same level		80.244	79.704	538	2
Falling Persons – Slip or Trip and Fall – Unspecified		3.737	3.713	24	0



DISCUSSION

On the other hand and according to the CPR 2024, **construction product manufacturers cannot be required to declare either the performance of the installed product** (for example, because its finish is modified on site) **or the on-site installation** (for example, because it is a floor manufactured on site, such as in situ concrete).

They can “only” be required to test the product itself (products manufactured at the factory) or a reference product produced at the factory/laboratory for testing purposes (products intended to be manufactured on-site).

When regulators request **testing on-site**, the manufacturer cannot be required to carry out these tests. Therefore, these controls **are under the responsibility of the relevant authority** and if required, they may be different from those required by harmonised product standards.

Different test conditions:

--- IN LABORATORY TEST

--- ON SITE TEST

DISCUSSION

PROBLEM: The current EN 16165 does **not only contain 4 tests**, but there are also at least **9 possible tests** due to the various options available when conducting the tests. Further definition is needed.

EN 16165	Annex	Footwear	Standardised contaminants
Ramp (barefoot)	A	Barefoot	Water with a surfactant
Ramp (footwear)	B	Occupational footwear	Oil
Pendulum (57 rubber)	C	Barefoot	Clean (dry conditions)
Pendulum (57 rubber)	C	Barefoot	Water (wet conditions)
Pendulum (96 rubber)	C	Rubber shoe heel	Clean (dry conditions)
Pendulum (96 rubber)	C	Rubber shoe heel	Water (wet conditions)
Tribometer (3 rubbers)	D	Rubber sole	Clean (dry conditions)
Tribometer (3 rubbers)	D	Rubber sole	Water with sodium lauryl sulphate
Tribometer (2 leathers, 1 rubber)	D	Leather sole, rubber heel	Clean (dry conditions)

PROPOSAL

PROPOSAL. In response to National regulations requirements

Defining separate “essential characteristics” grouped into:

A) Essential characteristics for providing the performance of factory-made products (including reference products intended to be manufactured on-site) and assessment methods for these construction products.

1. Friction properties when walking barefoot in swimming pools and bathrooms with a surfactant/soap contaminant.
2. Friction properties when walking with shoes in specific workplaces and public areas with an oily contaminant.
3. Friction properties when the heel slips on a floor in specific workplaces, public and residential areas, swimming pools and bathrooms with water contaminant (walking barefoot or shod)
4. Friction properties when the heel slips on a floor in specific workplaces, public and residential areas in dry conditions

B) Essential characteristics and assessment methods for providing the performance of a floor made on-site, modified on site or monitored during its service life.

1. Friction properties when the heel slips on a floor in specific workplaces, public and residential areas, swimming pools and bathrooms with water contaminant
2. Friction properties when the foot heel slips on a floor in specific workplaces, public and residential areas in dry conditions
3. Dynamic friction resistance properties at low speed with water and sodium lauryl sulphate contaminant

PROPOSAL. In response to 2024 CPR

Consequently, to meet the requirements of the 2024 CPR, the proposal currently under discussion is as follows (which addresses point A):

Essential characteristic	Assessment method	Declaration	Classes	Thresholds
A.1. Slip resistance – Barefoot + water and surfactant contaminant	Barefoot Ramp with specific test parameters, procedure and calculation	Value	If agreed	Established by each MS for each application
A.2. Slip resistance – Occupational footwear + oil contaminant	Shod Ramp with specific test parameters, procedure and calculation	Value	If agreed	Established by each MS for each application
A.3 Slip resistance – Footwear and barefoot + wet conditions with water contaminant	Pendulum in wet conditions with a specific rubber, procedure and calculation of the value	Value	If agreed	Established by each MS for each application
A.4. Slip resistance – Footwear and barefoot + dry conditions	Pendulum in dry conditions with a specific rubber, procedure and calculation of the value	Value	If agreed	Established by each MS for each application

Questions?

SLIPRESISTANCE Project (GA N°101196460)

Workshop, September 16th, 2025