

# 2019 World Ceramic Tiles Forum

6 November - 9 November

Westin Grand Hotel Berlin

Berlin, Germany





# ISO/TC 189 WG1-WG4

## Ongoing work on wear resistance



# What do we mean by wear?

## **OXFORD DICTIONARY:**

damage with use [intransitive, transitive]

to become, or make something become thinner, smoother or weaker through continuous use or rubbing

## **COLLINS DICTIONARY:**

*Uncountable noun* : Wear is the damage or change that is caused by something being used a lot or for a long time.

*Verb* : If something wears, it becomes thinner or weaker because it is constantly being used over a long period of time.





Wear resistance is defined as the ability of stone to resist comprehensive external forces such as abrasion, edge cutting and impact etc during service.

*From: Building Decorative Materials, Woodhead Publishing Series in Civil and Structural Engineering, 2011, Pages 25-53*

Wear is the damaging, gradual removal or deformation of material at solid surfaces. Causes of wear can be mechanical (e.g., erosion) or chemical (e.g., corrosion). The study of wear and related processes is referred to as tribology.

*(from Wikipedia)*





**WEAR  
RESISTANCE**

**≠**

**ABRASION  
RESISTANCE**

**WEAR  
RESISTANCE**

**LOSS WEIGHT**

**ABRASION RESISTANCE**

**FRETTING RESISTANCE**

**MECHANICAL DAMAGE RESISTANCE**

**(e.g. SCRATCH)**

**ETC.**



## **TWO PROJECTS ON WEAR RESISTANCE**



### **ISO/AWI TS 23051**

Universal test method for wear resistance by pedestrian traffic on floorings.

Recommendations for selection per intended use

*Proposed as TECHNICAL SPECIFICATION on August 2017*

### **ISO\_NP\_10545-22**

“Ceramic tiles - Part 22: Determination of resistance to wear with a multi-attribute method

*Proposed as STANDARD on May 2019*



## ISO/AWI TS 23051

## ISO\_NP\_10545-22

### SCOPE

The objective of this standard is to define a selection criterion ensuring that the **wear resistance on floorings** is adequate for its intended use, and therefore, the durability of such installation. This document is not intended as a comprehensive survey of **every condition affecting the suitability and durability of floor tile, but is concerned only with pedestrian traffic**, which is usually evident in tile surface alterations (changes in gloss and/or colour, stains). ..... **It is applicable to all types of floorings not showing a surface pattern with heights over 2 mm.**

*Technical issue*

### SCOPE

This part of ISO 10545 series specifies a **multi-attribute method** for determining the wear resistance of ceramic tiles

**THIS STANDARD  
IS ADDRESSED TO  
ALL THE APPLICATIONS  
OF CERAMIC TILES**

# ISO/AWI TS 23051

**All types of flooring materials ?**

**Are plastic based materials (e.g LVT/LVP) and other hard surfaces materials included ?**

**How do they perform ?**



## *Technical issue*

based on superficial abrasion test only

based on

- deep abrasion test
- superficial abrasion test
- weight loss
- scratch resistance

## *Technical issue*

for the superficial abrasion a new equipment is needed

for the superficial abrasion PEI instrument is adopted at 600 and 6000 rpm only

## *Technical issue*

the classification is based on 5 classes

the classification is based on 3 classes

## ISO/AWI TS 23051

## ISO\_NP\_10545-22

### **Technical issue**

Crystalline silica ( $\text{SiO}_2$ ) is used as abrasive agent

Crystalline alumina ( $\text{Al}_2\text{O}_3$ ) is used as abrasive agent

### **Healthy issue**

R phrase(s): 48/20  
Danger of serious damage to health by prolonged exposure/Harmful by inhalation.  
Hazardous component(s)  
Respirable crystalline Silica (RCS) H372: Long-term exposure to respirable dust can lead to respiratory system damage and disease. RCS has been associated with the lung disease silicosis.

R phrase(s): None  
S-phrase(s): S22:  
Do not breathe dust.  
Hazardous component(s): None

## *Economical issue*

A new abrasion device and a glossmeter shall be purchased for superficial abrasion test.  
\$\$

## *Economical issue*

This test will not replace the current version of ISO 10545-7 as it is a technical specification

A glossmeter shall be purchased for the superficial abrasion test  
\$

This test will replace the current versions of ISO 10545-6  
ISO 10545-7  
and Mohs test (it was a standard in the past)

# ISO/AWI TS 23051

# ISO\_NP\_10545-22

**Technical  
issue**

It is not applicable to  
tiles with relief > 2mm

Applicable to all types of  
tiles

Sample	Group	Color	ISO 10545-7	ISO/AWI TS 23051	
T5	<b>B – GLOSSY SMOOTH GL</b>	dark	0	L1	
T18		middle	3	L3	
T1	<b>C – POLISHED PORCELAIN TILE</b>	dark	0	L2	
T14		dark	2	L2	
T24		dark	1	L2	
T16		middle	4	L1	
T19		middle	3	L2	
T23		middle	2	L2	
T10		light	5	L2	
T15		light	5	L1	
T21		light	5	L1	
T25		light	5	L2	
T3		<b>G - MATT PLAIN COLOURS</b>	dark	2	H4
T4			dark	1	L3
T9	dark		2	L2	
T8	middle		2	L3	
T17	middle		3	H6	
T22	middle		4	H6	
T7	light		4	L1	
T11	light		5	H6	
T12	light		5	H5	
T13	light		5	H6	
T6	<b>A – POLISHED &amp; CRYSTALLINE GLAZES</b>	dark	0	L1	
T2	<b>E - GLOSSY GRITS &amp; RELIEFS</b>	middle	1	L2	
T20		dark	3	H5	

AWI TS 23051 classifies 1 class higher than PEI

AWI TS 23051 classifies 2 classes higher than PEI

AWI TS 23051 classifies 1 class lower than PEI

AWI TS 23051 classifies at least 3 class lower than PEI

ISO/NP 10545-22

Ballot type: NEW PROJECT

Opening date 2019-05-28

Closing date 2019-08-20

Ceramic tiles: Part 22:

Determination of resistance to wear with a multiattribute method

- determination of the deep abrasion resistance of tiles by measuring the length of the groove produced in the proper surface by means of a rotating steel disc, under given conditions and with the use of abrasive material;
- determination of the surface abrasion resistance of the ceramic tiles by an abrasive load on the surface and assessment of the wear by means of comparison of gloss and weight measurements carried out before and after the test;
- determination of the scratch resistance by drawing by hands with pencils of defined hardness over tile surface.

YES

NO

ABS

BALLOT  
RESULTS:

		YES				NO		ABS	
Sub-Total Question 1a	17	2	0	1	0	1	1	10	
Totals	20				1			11	

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Thank you for your attention!

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