Technical Bulletin 4.7

Anti-slip resistance Certification

The present Technical Bulletin provides detailed information on how to read and understand the anti-slip resistance certifications for Mactac Digital products.

Introduction

In the European countries, there have been various testing methods used for assessing the slip resistance of floor covering products with the most common norm being the DIN 51130:2004-6 (German national norm).
The variations in testing methods and classifications throughout the European countries made it complicated to assess products in different national countries but also lead to confusion and misinterpretations of the ratings.
The European harmonized standard EN 13036-4:2011 regarding slip resistance properties has been implemented and recognized as a standard in many countries.
Many health and safety institutions refer to this norm since it is more user friendly and the results are better comprehensible than the other norms.

EN 13036-4: European Standard

The European Standard EN 13036-4:2011 provides the slip resistance classification for all flooring products.
This norm is defined by the Pendulum Test method to assess a floor's surface properties under dry and wet conditions determining slipperiness and the level of potential risk of injury. The Pendulum Test is an established reliable method. It is measured by means of a slider mounted at the end of a pendulum arm which imitates the action of slipping and determines the dynamic friction of the surface.
The results are measured on a scale under a "Pendulum Test Value" (PTV).

Pendulum Test Value (PTV) rating

The table presented below is intended as a guide only. Many factors, such as type of pedestrian activity and user (such as age and physical ability) should also be considered.

The minimum slip resistance value that is deemed to be safe for pedestrians in public spaces is 36 PTV in the worst contaminated conditions (wet).

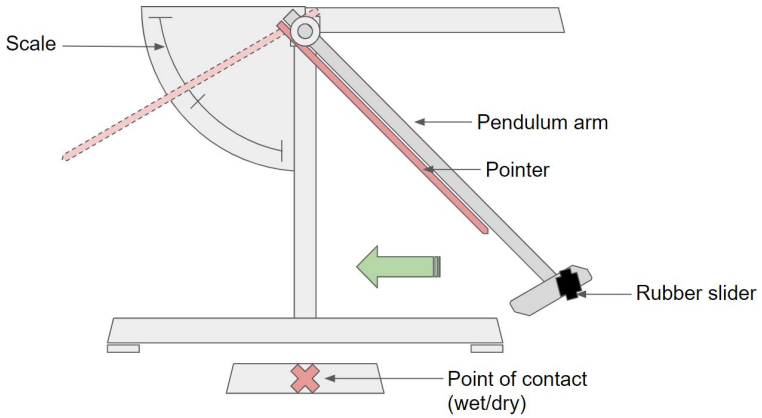
Level of Slip Potential	Rating	Probability of Slip
High Slip Potential	0-24 PTV	Up to 1 in 20
Moderate Slip Potential	25-35 PTV	1 in 100,000
Low Slip Potential	36+ PTV	1 in 1,000,000
Extremely low Slip Potential	75+ PTV	Less than 1 in 1,000,000

Testing

The Pendulum Test method is a simple device which replicates in a reliable and accurate way the Dynamical Coefficient of Friction (COF) of a heel on floor surfaces. A person's heel is the part of the foot which starts slipping first in most floor slip situations.

The device is operated by a swinging arm that sweeps over a plane surface. The swinging arm is mounted with a rubber slider which strikes and slides over the surface in a designated contact distance.

The arm is placed horizontally with a pointer and when it is released, it swings and once it strikes the surface, the friction decelerates the arm which travels at a certain distance placing the pointer on a scale.
The more slippery the surface will be, the further the swinging arm will travel.



- **Step 1:** The Pendulum arm is setup in a horizontal position. The pointer is attached to the main arm.
- **Step 2:** The main arm is released and falls in a swinging movement. The rubber slider makes contact with the surface and will travel a certain distance according to the friction resistance.
- **Step 3:** The pointer is released on it's furthest distance on the scale.

  This process is repeated 5 times to achieve an average rating.

German Standards:

The German Standards DIN 51130 and DIN 51097 provides the slip resistance classification for all flooring products according to the Ramp Test method to assess floor's surface resistance properties.

The values are classified in two theoretical sets:

- DIN 51130 - "R" ratings for shod feet: R9 to R13, R9 being the lowest value defined as poor resistance.
- DIN 51097 - "ABC" ratings for bare feet: A to C, A being the lowest value.

DIN 51130: Ramp Test "R" rating (shod feet)

DIN 51130 is required for internal and external walkways in dry and wet conditions.

Classification	Slip Angle	Coefficient of Friction (CoF)
R9	6° - 10°	0.11 - 0.18
R10	>10° - 19°	>0.18 - 0.34
R11	>19° - 27°	>0.34 - 0.51
R12	>27° - 35°	>0.51 - 0.70
R13	>35°	>0.70

DIN 51097: Ramp Test "ABC" rating (bare feet)

DIN 51097 is required for wet room floors such as bathrooms and swimming pools.

Classification	Slip Angle	Coefficient of Friction (CoF)
A	12° - 17°	0.21 - 0.31
B	18° - 23°	0.32 - 0.42
C	>24°	>0.45

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Pendulum Test method versus Ramp Test method

Pendulum Test method:

- Provide results in both wet and dry conditions
- Widely used and recognised in the European countries and abroad
- Reproducible test method
- Results more comprehensive and user-friendly

Ramp Test Method:

- Test method is not objective
- Is a reference in the European countries and abroad
- Can be used for exact shoe sole / flooring combinations
- Interpretation of "R" ratings is difficult

The following table is intended as a guide only and does not represent a direct correlation of the ratings from the German standard DIN 51130 to the European standard EN 13036-4.
The testing methods are different according to their specific norms and the values are not comparable.

DIN 51130 R9 to R13 ratings (shod method)	EN 13036-4 Pendulum Test Value (PTV)	Likelihood of slip injury
R9	11 to 18 PTV	Very Poor - Slip injury almost certain to occur
R10	18 to 34 PTV	Poor - Slip injury likely to occur
R11	34 to 51 PTV	Moderate - Slip injury may occur
R12	51 to 70 PTV	Low - Slip injury unlikely to occur
R13	70+ PTV	Extremely Low - Slip injury rare to occur

Source: http://www.floorslip.co.uk/floor-slip-ratings.html

General Remarks:

- When a product is issued, it is always ensured to cover the requirements for their specific application.
- The certification document is only applicable for the products which are mentioned on the corresponding classification document.
- With regards to self-adhesive films; they may be applied onto a dedicated substrate or overlaminated on top of another self-adhesive film.
- Combinations of self-adhesive films should be tested, if required, as one product to determine the classification. When mounted together, two materials classified in a given rating do not automatically result in an end product with the same classification.
- In order to ensure anti-slip properties of specified self-adhesive films, surfaces must maintain clean and dry throughout the usage period. Dirt, liquids and any other contaminants will increase the risk of slip and therefore injury will most likely occur.

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