Ceramic Tiles

Slip, Slip Resistance, Its Specification And Maintenance

Approved CPD Network Presentation
The problem with slipping!

- It is the resultant of a complex and constantly changing set of variables
- It is a highly subjective phenomena
- There is no single suitable test method
- There are no ISO, Pan European or British Standards for testing or specification of slip resistance
The factors that influence slip

- Barefoot or Shod
- Ascending or Descending
- Wet or Dry
- Type of Shoe
- Speed of Travel
- Surface Roughness
- Heel/ Sole Material
- Contamination Present
Brief summary of the main factors likely to affect slip resistance

<table>
<thead>
<tr>
<th>Application</th>
<th>Flooring</th>
<th>User</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet/ dry/ ice</td>
<td>Surface roughness</td>
<td>Age of user</td>
</tr>
<tr>
<td>Clean/ dirty</td>
<td>Surface design (riven/ profiled)</td>
<td>Infirmity/ disability</td>
</tr>
<tr>
<td>If dirty, type</td>
<td>Change of surface</td>
<td>Distracted</td>
</tr>
<tr>
<td>Shod/ bare foot</td>
<td>Contamination</td>
<td>Expectation</td>
</tr>
<tr>
<td>Speed of travel</td>
<td>Cleaning/ maintenance</td>
<td>Type of shoe</td>
</tr>
<tr>
<td>Stops &amp; starts</td>
<td></td>
<td>Type of heel/soling</td>
</tr>
<tr>
<td>Steps/ slopes</td>
<td></td>
<td>material used</td>
</tr>
<tr>
<td>Type of traffic</td>
<td></td>
<td>Walking/ pushing/</td>
</tr>
<tr>
<td>Likely activities</td>
<td></td>
<td>carrying objects</td>
</tr>
</tbody>
</table>
How does slip resistance work?

Mechanical interface
Combination of both
Friction interface
Examples of Profiled Tiles
Examples of Enhanced Friction Tiles
Hospital Application

- Dry internal application
- ✔ Low speed of travel
- ✔ Low activity level
- ✔ Cleanability critical

? Risk if liquid spillage
? Effective cleaning regime required
Shopping Mall

Internal application

✓ Moderate speed of travel
✓ Straight line of travel (?)
✓ Flat, level surfaces

? Users distracted
? Users carrying bags, etc.
? Sudden changes in direction
? Wet entrance areas
Commercial Kitchen

- Wet processes
- Spillage liquids, fats, etc.
- Physical work activities
- High risk environment
- Shod foot area
- Must be readily cleanable

✅ Consider tiles with tiles with small but well spaced studs
Motor Vehicle Workshop

- Oil spillage
- Wet working areas
- Vehicular/pedestrian slip resistance
- Cleanability
- Moderate risk work activities

Consider tiles with a grit inclusion
UK test method for measuring slip resistance

Pendulum Tester

✓ Portable
✓ Lab & insitu applications
✓ Heel strike slips

✗ Results vary with rubber compound used
✗ Not good on profiled tiles
✗ Poor differentiation at mid range
DIN test method for measuring slip resistance

DIN Ramp Test
- Established national standard test method
- Suitable all floor surfaces
- Test bare foot and specific shoe/contamination/surface combinations

- Laboratory use only
- Results of an empirical nature
# DIN Slip Resistance Classification

<table>
<thead>
<tr>
<th>DIN Slip Resistance Class</th>
<th>Ramp Inclination</th>
<th>Typical Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>R9</td>
<td>&lt; 9°</td>
<td>Low risk, Reception areas</td>
</tr>
<tr>
<td>R10</td>
<td>10 to 19°</td>
<td>Self serve cafeterias</td>
</tr>
<tr>
<td>R11</td>
<td>20 to 27°</td>
<td>Dish washing areas</td>
</tr>
<tr>
<td>R12</td>
<td>28 to 35°</td>
<td>Commercial kitchens</td>
</tr>
<tr>
<td>R13</td>
<td>&gt; 35°</td>
<td>High risk, Slopes, liquid spillage</td>
</tr>
</tbody>
</table>
### Specification of surface drainage to assist slip resistance

<table>
<thead>
<tr>
<th>Slip Resistance Class</th>
<th>V4</th>
<th>V6</th>
<th>V8</th>
<th>V10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage capacity</td>
<td>4 Cm³/dm²</td>
<td>6 Cm³/dm²</td>
<td>8 Cm³/dm²</td>
<td>10 Cm³/dm²</td>
</tr>
<tr>
<td>Least Drainage Capacity</td>
<td>Most</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## DIN Specification for Slip Resistance

<table>
<thead>
<tr>
<th>DIN Specification</th>
<th>Typical Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>R9V. R10V.</td>
<td>General internal applications (dry conditions, low risk activities)</td>
</tr>
<tr>
<td>R11V. R11V4</td>
<td>Moderate risk applications (e.g. some spillage, commercial kitchens)</td>
</tr>
<tr>
<td>R12V4 R12V8</td>
<td>Wet &amp; high risk applications (e.g. frequently wet, industrial, speed)</td>
</tr>
<tr>
<td>R13V10</td>
<td>Very high risk applications (e.g. Fish processing, abattoirs)</td>
</tr>
</tbody>
</table>
The effect of Surface Drainage on Slip Resistance
Summary: To select the correct anti slip tile for the job

- How will the floor be used
- Is slip resistance a key consideration
- Specify the reasons/ user requirements
- Any applicable guidelines available
- Tile manufacturer verify suitability
Maintaining slip resistance in service

- It is important that ceramic floor tiles are cleaned effectively to maintain their slip resistant properties.

- The frequency & cleaning materials needed will be determined by the application and the type of contamination the floor is exposed to.

- In addition to daily cleaning, regular “deep” cleaning is recommended to remove the build up of cleaning material residue.