

Introduction...

CEN TC339 standards for measuring floor slip risk

The CEN TC339 committee has been striving for years to establish a common measure of floor slip risk. The committee has been divided in three camps, partly because of geographic boundaries and partly because there has been no single method of measuring slip risk that everyone agrees upon that mirrors the complex physics of slipping and delivers consistent and accurate results. With no "absolute" measure to assess slip test machines how can test machines be assessed?

The search for a new or better measure

The TC339 committee has called for all countries to put forward slip test methods in common use. The committee has long been unable to agree that any one test is "the best". Fans of the German Ramp Test like its repeatability, fans of the UK Pendulum believe that PTV results correlate with actual slip experience. However, both methods have obvious weaknesses: the Ramp Test uses oil and studded boots (how can that simulate wet pedestrian slip risk) and anyway it cannot be used to test floors in-situ. The Pendulum results can vary significantly because it has an analogue reading, can easily be out of calibration and requires an experienced user.

Most other test methods do not work or cannot be proven

Many other test measures exist. Rz microroughness is the most common end-user slip test method in the UK. Detractors say it is a poor measure of slip risk and cannot detect contamination or change to slip risk. Trundle devices such as the Tortus, GMG or FSC2000 measure co-efficient of friction but because of their slow speed of movement they do not appear to correctly measure wet slip risk (the biggest cause of slips).

SlipAlert has been ignored until now

The UK representatives on TC339 have until now been keen to limit discussions to the set of test machines that have already been considered by the group: the German Ramp Test and the TRL Pendulum. As a result, despite the fact that SlipAlert was invented by Dr Malcolm Bailey then Chair of the UK TC339 committee, it has not been promoted to the wider TC339 Group until now.

It is time for a step change in floor safety

TC339 has called for a new review of slip test machines and that review must now include SlipAlert. SlipAlert has been hiding in the shadow of the Pendulum for too long. SlipAlert does offer similar results to the Pendulum but it also offers many benefits: ease of use, digital display, greater precision, more consistency, better repeatability and reproducibility. SlipAlert more closely mirrors the physics of a slip and it is designed to be easy to use for measuring new floors and for monitoring changes to slip risk caused by contamination, wear or poor cleaning. SlipAlert allows non-experts to reliably measure slip risk.

You can take the first step

Please consider the case for SlipAlert. As a common European measure of slip risk SlipAlert has the potential to dramatically reduce slip accidents across Europe. For any business, SlipAlert saves time, saves money and reduces slip risk. Please read on or try SlipAlert floor testing and see for yourself the benefits it could bring.

The case for SlipAlert

SlipAlert should become the standard measure of floor slip risk across Europe. You may feel this is an extravagant claim of the type you would expect from the manufacturer of a slip test device. However we make no apology for our claims regarding the benefits of SlipAlert and this paper is designed to convince you that SlipAlert is the best slip measurement device. It should be adopted across Europe in a bid to reduce slip accidents.

You will read that SlipAlert outperforms other test machines in almost every way. It may be natural to dismiss these claims as the hyperbolae of the manufacturer; we would ask you to consider the level of detail in our understanding of pedestrian slip risk borne out of use of SlipAlert measurements from real floors. We ask you to try SlipAlert and consider the potential benefits for floor safety if it were widely adopted across Europe.

If there was a slip test method able to significantly reduce slip accidents, would you want to consider it properly?

Test our claims – try SlipAlert

All of the claims we make are easy to test. For example, we claim that SlipAlert is consistent and easy to use providing good results for repeatability and reproducibility. We claim it reflects actual slip risk, and we claim it can be used to detect contamination or poor cleaning of a floor. These claims can easily be tested and we challenge you to try SlipAlert and judge for yourself. Included below are simple tests that you can use to verify these claims. No other machine will outperform SlipAlert in testing for slip risk.

How to measure a new test machine when there is no definitive benchmark measure...

Pedestrian slipping involves a complex interaction between the person's shoe/foot, the floor surface and any contamination between the floor surface and the shoe. There is no definitive benchmark measure, because different machines measure different aspects of slip risk. So, how can we assess a new slip test machine?

SlipAlert outperforms the best machines currently in use:

- Designed to simulate the physics of an actual pedestrian slip
- Like the Pendulum, SlipAlert has been shown to match closely with actual slip experience. SlipAlert is quicker and easier to use and delivers more precise measurements and more reliable measures.
- Like the German Ramp Test, SlipAlert offers reliable results yet SlipAlert can be used to measure floors in-situ and any user will obtain reliable results

A step change in floor safety

SlipAlert has lived in the shadow of the Pendulum for too long. It is a better slip test machine than any other and far better than most. It offers enormous potential to transform floor safety, to encourage the buying of floors with suitable slip resistance and durability of slip resistance, to encourage effective floor maintenance and to encourage effective cleaning. Widespread appropriate use of SlipAlert will improve floor safety and will reduce accidents.

You can make a step change in floor safety across Europe. If you read this document, try SlipAlert and if you agree with us, then please encourage your colleagues and CEN TC339 representatives to fully consider the merits of SlipAlert.

The case for in-situ floor testing and monitoring of slip risk over time...

Most new floor surfaces can only be measured for slip risk when they are laid...

Resin or concrete floors can only be measured when they are laid. For other manufactured floor surfaces while it is possible to have standard measures done in laboratory conditions these can only give a hopeful guide to the actual floor slip risk. When the floor is laid the surface slip risk may be different: polishing of tiles after grouting, coatings on wood etc will change the slip risk.

The case for monitoring of floor slip risk

Floor slip resistance changes over time. Some floors suffer poor cleaning or a build up of contamination, some are subjected to a change of use, some have polish or coatings applied to them, and some are subjected to high degrees of wear. Most slips occur because of contamination of some kind on the floor surface and the HSE estimate that 50% of those slip accidents could be prevented by monitoring of changes to slip risk.

The case for a simple and reliable standard slip test that anybody can use

Monitoring the slip risk of floors will be most effective if it is done when floors are laid, when floors are changed and when slips occur. That will only be possible if ordinary business people, not just scientists, are able to measure and understand slip risk. Health & Safety Managers should understand the slip risk of floors in their businesses. Cleaning managers should understand slip risks and know which floors can/cannot be safely wet mopped while people are present. Slip testing should be done when floors are laid or changed and periodically to test the effectiveness of cleaning which is only possible if cleaning staff and commercial flooring installation teams are able to take slip risk measurements quickly and easily.

Floor safety should not be ignored

Slips remain one of the biggest causes of serious accidents and account for many injuries, time off work, and even hospitalisation or serious complications for the elderly. In areas of fire or electrical safety there are standard tests that reduce risk. Floor safety will be much improved by the instigation of a standard measure that is used across Europe. That measure must be quick, easy and give a reliable indication of slip risk and changes to slip risk.

Floor testing/monitoring will reduce accidents

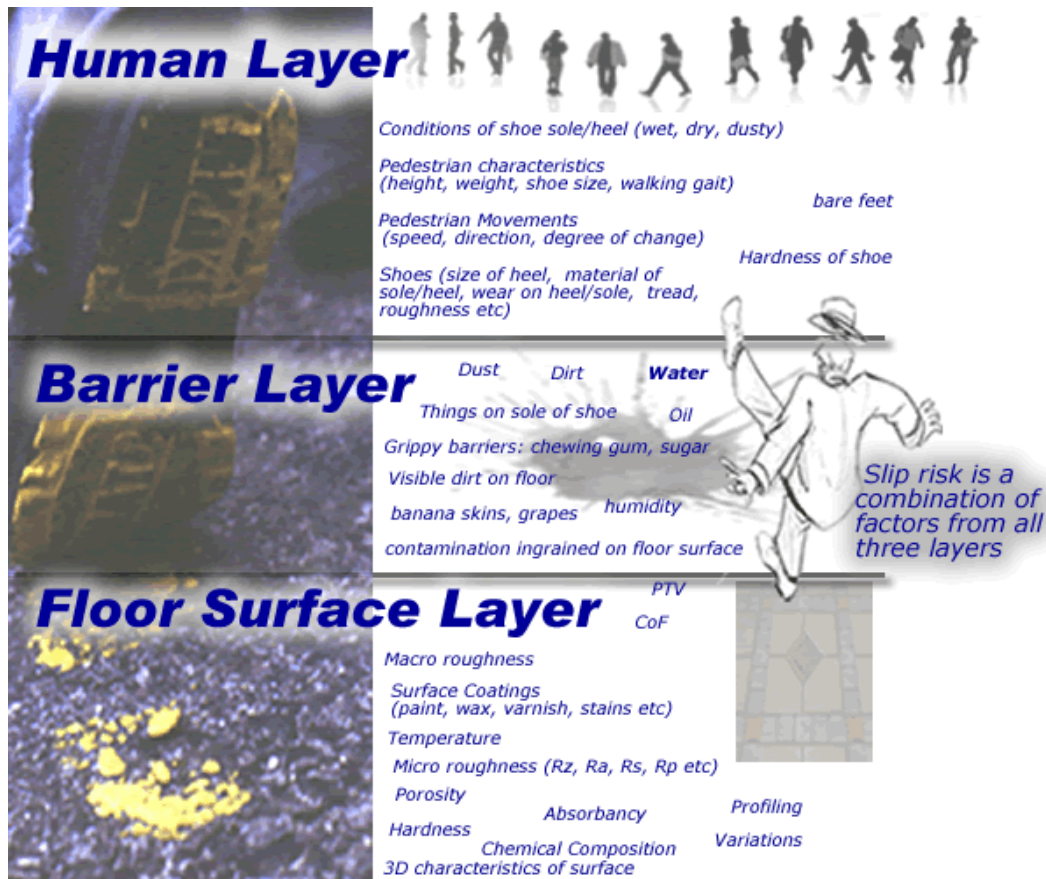
UK HSL tests suggest that up to 50% of commercial floors they visit fail to meet their minimum acceptable slip safety standards (PTV > 24). Testing all new floors and monitoring existing floors will significantly improve floor safety and will reduce accidents. Testing all new floors is practical and cost-effective (avoids laying poor flooring). Monitoring of slip risk is practical and cost-effective and will reduce slip injuries.

Measures of Pedestrian Slip Risk – Factors to compare

Factor	SlipAlert	Pendulum	German Ramp	UK Ramp	SC2000 GMG Tortus	Rz roughness
Measures Dry Slip Risk	Y	Y	?	?	Y	X
Measures Wet slip risk (vital)	Y	Y	?	?	X	X
Simple to use (Intuitive, easy for user to detect any erroneous measures)	Y	X	n/a	X	Y	X
Consistent (repeatability and reproducibility) (vital)	Y	?	Y	X	Y	X
Educational	Y	n/a	n/a	?	?	X
Ability to measure slip risk of heavily profiled surfaces	Y	?	Y	X	X	X
Detects change to slip risk caused by contamination (vital)	Y	Y	?	Y	?	X
Detects changes to slip risk caused by dry contaminants (dust, flour, etc)	Y	Y	Y	?	Y	X
Detects change to slip risk caused by wear (vital)	Y	Y	n/a	?	?	X
Detects change to slip risk caused by combinations of contamination with water	Y	Y	n/a	?	X	X
Measures the effects of floor coatings and paints both when applied and also after use: contamination, cleaning and wear. (important)	Y	Y	n/a	?	?	X
Measures the effects of Anti-slip treatments when applied and also after contamination, cleaning and wear. (important)	Y	Y	n/a	?	?	X
Can be used in-situ (vital)	Y	Y	X	X	Y	Y
Can be used to benchmark test every new floor when laid (vital)	Y	?	X	X	X	X
Can be used to monitor the effectiveness of cleaning and changes to slip risk caused by contamination and wear (vital)	Y	?	X	X	?	X

Three-layer model for slip prevention

There can be no perfect measure of pedestrian slip risk because slip risk is a combination of many factors relating to the surface of the floor, the person walking and any barriers between the pedestrian and the floor surface (such as: contamination, water, grease, dust etc). This three-layer model describes the complex interaction at the time of a slip incident and helps to explain the value of management information in preventing future slip accidents.



Measuring and managing slip risk

It helps to measure the slip resistance of the floor surface to provide management information about the slip resistance of the floor when it is clean, wet or contaminated. This allows slip risk to be managed. This slip test information can be used to make small changes that will reduce slip risk: e.g. in kitchens footwear can be controlled, in swimming pools and changing rooms the floor can periodically be deep cleaned to remove build up of body fat. In all situations improvements can be made: e.g. for floors with high wet slip risk - restricting cleaning till after people leave the building, or careful drying after floors are mopped, or restricting people's movements to slow them before areas of high risk floor.

For more information on measuring and managing slip risk and how to use the 3-layer model please [contact SlipAlert](#).

Slip measurement factors - explained

Factor	Comment
Measures Dry Slip Risk	Although most slips occur on wet floors, some floors require high slip resistance when dry and some floors are subjected to contamination by dry contaminants such as dust.
Measures Wet slip risk	This is the most important factor because slips generally occur on wet floors and often on a floor that has other contamination working in combination with the water.
Simple to use	Simplicity is important. Business users should understand the slip test results they receive and trust the outcome.
Consistent results	Measures must be reliable for comparison with safety benchmarks.
Educational	Cleaning managers, purchasing managers, maintenance managers should all understand the slip risk of different floors and the importance of an effective cleaning regime. The measurements they take should be meaningful and easy to understand.
Detects change to slip risk caused by contamination	Floor slip risk will vary over time, caused by wear, spills, build up of contaminants, use of incorrect cleaning materials etc. It should be possible to determine the durability of slip resistance of different floor surfaces and which factors improve floor safety and which increase slip risk on different floor types/situations.
Detects change to slip risk caused by wear	Durability of slip resistance is just as important as the slip resistance performance when the floor is new. Slip resistance can change as a result of wear; for some floors slip resistance improves for other floors the slip resistance reduces very quickly with wear.
Measures the effects of floor coatings and paints	Coatings and paints will affect slip risk of the floor. It should be possible to compare the floor safety as soon as the paint or varnish dries and also after a period of wear.
Measures the effects of Anti-slip treatments	Anti-slip treatments (acid-etch) change the floor surface and the slip resistance of the floor, they may damage the floor and make it harder to remove contaminants. Test on application and after use.
Ability to measure slip risk of in-situ floors	The slip risk of new laid floors will not necessarily match a manufacturer's specification. Wooden floors are often painted, varnished or waxed. Tiled floors are polished after grouting. The slip risk of resin floors may vary according to the method of application.
Potential use to benchmark test every new floor when laid	If every new floor was measured when laid, it would be easy to determine the level of slip risk required for different situations. It would also provide a vital benchmark for comparison over time to determine the durability of slip resistance.
Potential use to monitor the effectiveness of cleaning	If every floor has a benchmark value for slip resistance it would be easy to test the effectiveness of cleaning periodically and thus prevent potential accidents.

Strengths Weaknesses per test method

	Strengths	Weaknesses
Pendulum	<p>Measures wet slip risk</p> <p>Good approximation to actual slip experience</p> <p>Portable (though bulky)</p> <p>Can measure differences in slip risk between hard rubber, bare feet and soft rubber (especially useful in swimming pools)</p> <p>Simulates speed of slip required to create squeeze film effect that causes wet slip risk</p>	<p>Repeatability and Reproducibility is poor even with experienced operators.</p> <p>Machine can be out of calibration</p> <p>Difficult to test on heavily profiled surfaces.</p> <p>Requires experienced operator.</p> <p>Bulky and awkward to transport</p> <p>Readings are subject to error because of analogue scale</p> <p>The range of slip risk 1:20 to 1:1 million is represented by just 12 points and variability of test results can be as much 5 points – equating to high uncertainty</p> <p>The 1st Pendulum test swing can change the surface/contamination and thus later results may be misleading</p>
German Ramp	<p>Consistent results.</p> <p>Can be used to measure change to slip resistance caused by wear (<i>in laboratory situation</i>)</p>	<p>Measures slip risk with boots and oil lubricant. May not always indicate wet slip risk. Cannot be used when floor is laid therefore R numbers quoted for floors cannot easily be verified after installation</p> <p>change to slip risk over time cannot be measured in-situ</p>
UK Ramp	<p>Tries to simulate real walking experience. Can be used to test effects of different footwear. Can be used to test slip resistance of mats on the floor surface.</p>	<p>Does not accurately correspond with PTV or known slip risk of real floors. Walking action is critical to the outcome and so this test can only be useful for comparing samples in one test session with the same walker.</p>
FSC2000, Tortus, GMG	<p>Portable. Consistent. Detect changes to slip resistance caused by dry contaminants.</p>	<p>Cannot accurately determine wet slip risk. Cannot reproduce squeeze film effect because speeds are too low. Often measures wet slip as being lower than dry slip risk on surfaces where that is obviously wrong. (<i>grouped because of this common weakness</i>)</p>
Rz roughness	<p>Portable meter</p> <p>Theoretically a single set of dry measurements will predict slip risk on wet floor or greasy floors</p>	<p>Does not actually measure slip resistance of a real floor. Poor correlation with slip risk of floors with PTV > 24. Cannot measure changes to slip resistance caused by wear or contamination. Measures just one factor of the many that influence actual slip resistance. A pointless test.</p>

We challenge other slip test manufacturers and supporters to try SlipAlert and compete with SlipAlert ability to offer quick, easy and effective measures of floor slip risk that can be used to reduce accidents. [Contact SlipAlert if you think there is a better test method.](#)

SlipAlert Strengths

- Good repeatability and reproducibility. Test results from 3 different users each making two measurements of slip risk on 10 different floor surfaces show remarkable consistency – see below.
- Good match with TRL Pendulum results. (as tested by Dr Malcolm Bailey, the UK HSE and in Australia by CSIRO)
- **Measures both wet and dry slip risk** – this is a critical factor since most slips occur when there is water or other contamination on the floor
- Detects changes to slip risk caused by wear and contamination (in line with TRL Pendulum measures and real slip experience – e.g. grease on floor results in higher slip risk).
- Can measure slip risk on profiled surfaces.
- Can measure differences in slip risk with different types of rubber: hard rubber to simulate shoe heels or soft rubber to simulate bare feet and trainers.
- Easy to use. Users should be proficient in using SlipAlert after carefully reading the instructions or having 2 minutes of training.
- No calibration is required as there are no springs. Simple self-diagnostic checks ensure SlipAlert is working.
- Ease and speed of testing makes it possible to quickly test large areas of floor and identify any contamination or areas with variance from the norm.
- Simulates speed of slip required to create squeeze film effect (*aqua-planing*) that causes wet slip risk and therefore provides an accurate measure of wet slip risk.
- Digital scale hence no ambiguity of result.
- SlipAlert definition of slip risk 1:20 to 1:1million represents 43 points of SlipAlert Test Value scale; measurements are consistent within 1-2 points, offering significantly greater clarity of result than the Pendulum.

SlipAlert Weaknesses

Potential Weaknesses	Mitigation
Cannot measure in confined spaces.	Most pedestrian slipping on floors happens where people are able to walk freely. Most floors have some area of floor surface sufficiently large to test with SlipAlert.
Cannot give detailed measure of slip risk of small or irregular shaped objects where there is no room for SlipAlert to travel continuously on one surface (e.g. manhole covers, floor designs made with small interwoven different tiles)	Experienced SlipAlert users will be able to get a good indication of the slip risk of awkward shaped items on the floor surface by making different measures and comparison with surrounding surface results. Ideally floors should be designed to avoid significant changes to slip resistance from adjacent surface and SlipAlert is able to test for that and will indicate the overall slip risk.

SlipAlert is the only test method offering a guaranteed reduction in slip accidents when it is used with an approved floor safety regime. [Contact SlipAlert for more details.](#)

Pedestrian Slip...

No one has yet built a machine which exactly simulates what happens in a pedestrian slip, so any claims about a particular machine or method must be judged on the closeness to which they reproduce a pedestrian slip and on actual slip experience compared with test results.

What we know about Pedestrian slip action

A pedestrian slip has been analysed by Christer Bring in the 1980s and shown to have an initial speed of close to zero accelerating up to speeds of around 2 metres/second at the end of the slip, i.e. an average speed of 1 metre/second. The distance covered by the sliding heel is between 0.5 and 0.6 metres. The downwards force is reasonably constant (on average 500N) during this process.

Pendulum and pedestrian slips

The Pendulum simulates the slip only in its 2 metres/second phase, i.e. right at the end of the slip. It does not simulate the initial phase of the slip action where the foot accelerates from zero. The Pendulum correlation is only based on accidents and that where the reading is generally below 25. There is no documented evidence to show what correlation there is for floors which are known to be safer.

Taking Pendulum measurements can change the slip risk

When testing with the Pendulum the same area of floor is swept each time by the slider. In the dry it is not unusual for the initial reading to be lower than subsequent readings suggesting dry contaminants are removed by 1st swing. In the wet the first measure is usually higher than subsequent measures. The 'difference' between the first reading and the average of the last five of eight can be significant. No one has done any research either experimental or theoretical to determine which of these readings more correctly indicates the true slip potential of the floor. The action of the slider may artificially 'modify' in some way the measured behaviour of the floor surface.

Four S Rubber – not the best measure for floor safety

Four S rubber/Slider 96 is a very poor test rubber since its preparation has a significant effect on the result in wet conditions. It has very poor wear characteristics and is at the wrong end of the heel rubber friction spectrum. It has far too good frictional properties in the dry to be used to characterise the typical range of heel rubbers.

SlipAlert: better than Pendulum and Four S rubber

SlipAlert closely mimics an actual slip action and delivers results that match slip experience:

- The downward force is constant
- The speed varies across the range experienced by the heel during a slip (in reverse)
- The distance travelled on a safe floor by SlipAlert is similar to typical slip length
- SlipAlert tests have less impact on the floor than the Pendulum. Test location can easily be changed and re-tests made on unchanged areas of floor
- SlipAlert standard rubber wears better than Four S and is a better indicator of normal pedestrian footwear

SlipAlert uses for reducing slip risk and preventing slip accidents...

SlipAlert can be used throughout the life of a floor to help businesses to understand and manage slip risk and to reduce slip accidents.

SlipAlert can be used:

- When Specifying, Buying, Laying new floors
- For managing effective maintenance – replacing tiles, re-coating surfaces etc
- To help plan and manage an effective cleaning regime
- To determine durability of slip resistance
- To promote environmentally friendly floor safety regimes

SlipAlert: Specifying, Buying, Laying new floors

All new floors can and should be tested. Floors intended for wet use: swimming pools, changing rooms etc should be specified and tested for having good slip risk when wet. Floors that are likely to be dry most of the time should have good slip resistance when dry but also a reasonable degree of wet slip resistance appropriate for the situation. A single measurement scale – e.g. SlipAlert Test Values that can be tested when the floor is laid will make it easier for quality flooring companies and buyers of new floors.

SlipAlert: Managing and maintaining safe floors

When replacing tiles, repairing a floor or when any paint or coating is applied to the surface, the slip risk should be measured before and after the change.

Specifying and managing an effective cleaning regime

With SlipAlert, cleaning regimes can be designed around minimizing the slip risk. For example, while people are in the building, avoid mopping (or mop and dry carefully) floors that present a high wet slip risk. SlipAlert tests will highlight any issues with changes to cleaning method, cleaning materials or cleaning frequency. It will also detect any build up of contamination that may necessitate a change to the cleaning regime or the need for occasional deep cleaning.

Assessing the durability of slip resistance

SlipAlert will measure changes to the slip resistance of a floor as it wears. This will help flooring manufacturers and help informed buying decisions. **Note:** some floors have better slip resistance as they wear.

SlipAlert and the environment

SlipAlert can help to extend the life of floors (floors purchased for durability of slip resistance and avoiding replacing floors that just need proper cleaning. SlipAlert can also be used to test which “green” cleaning methods are effective in limiting slip risk.

Visit our website for more information on floor safety including: purchasing safe floors, managing effective cleaning, effective floor maintenance, and effective health & safety measures that will reduce slip accidents.

SlipAlert saves time, money and reduces slip accidents...

MOD prevent slips on ships

The British Ministry of Defence had problems with slip accidents on floors on board ships and at their docks. They found one particular type of flooring from one supplier appeared safe enough on most ships but seemed to be the cause of frequent slip accidents on some ships. They employed material scientists to investigate this serious and dangerous problem. Eventually they tested all of the floors with SlipAlert and concluded that the flooring installers were following different procedures and so the slip resistance of the finished floors varied significantly. MOD has now standardised the installation method and all floors are now safer.

Supermarket chains save time and money preventing slips

Supermarket chains like Tesco and Sainsbury use SlipAlert to test new floors and changes to floors and thus weed out the possibility of badly installed floors or the use of inappropriate flooring materials. They also use SlipAlert to test anti-slip treatments and thus avoid wasting time and money on ineffective treatments or treatments that damage the floor surface.

Flooring companies measure slip risk when floors are laid

Suppliers of natural stone tiles (*granite and marble*) and suppliers of man made concrete tiles know that the finish on the floor surface can greatly change the slip risk. They use SlipAlert to test newly laid floors and would like to be able to refer their clients to a European standard against which to measure newly installed floors.

FERFA members use SlipAlert on resin floors

Members of FERFA, the resin flooring association, use SlipAlert to test newly laid floors. FERFA members and their customers would benefit from a European standard for measuring slip risk of new floors which can be tested when floors are laid.

RAF ground improvements

The RAF manage acres of land and have found that some floors and paths present a high slip risk. Speed of testing makes SlipAlert the ideal test tool to test on such a large scale.

Fire Services discover safe flooring

Emergency Services like Essex Fire want to keep their floors safe. A small team seconded from fire stations is responsible for testing slip risk. Tests on a proposed new type of flooring showed it was not fit for purpose before it was deployed across regional fire stations. They find SlipAlert saves them time and money and makes life easier for staff.

Swimming pools easy to test and plan for deep cleaning

Swimming pool flooring is a particular challenge. People walk around in bare feet depositing body fat which gets ingrained on the floor. The slip risk rises despite daily cleaning. Testing with SlipAlert alerts the cleaning/operations teams when the floor requires deep cleaning.

Who would benefit?...

(if TC339 adopt SlipAlert as a reliable measure of slip risk that monitors change)

Suppliers of Quality Flooring

Manufacturers, suppliers and installers of quality flooring would benefit being easily able to differentiate their services and offer safe floors suitable for the intended purpose.

Quality Anti-Slip Services

Suppliers of anti-slip tape, coatings or anti-slip treatments will be able to demonstrate the quality and suitability of their products and services.

Quality Commercial Cleaning Businesses

Good commercial cleaners will be able to show that they are keeping floors clean and safe. They will be able to advice on effective cleaning materials and a cleaning regime that minimizes slip risk.

Flooring Maintenance Firms

The best flooring maintenance firms will be able to maintain safe floors and test repairs, test new floor coverings, paints or coatings. They should also be able to extend the life of quality floors and provide feedback to flooring manufacturers on durability of slip resistance.

Slip Consultants

Instead of being paid to use expensive or inaccurate slip tests, slip consultants will be able to work with clients to advise on improvements to floor safety based on reliable test data on floor slip risk. Quality consultants will be able to help their clients to implement an effective floor safety regime that reduces slip accidents.

Commercial Businesses will save time money and trouble

For any commercial business it will be far easier to purchase safe flooring suitable for their needs. They will be able to check their cleaning is effective and they will gain valuable management information on slip risks of all their floors allowing them to manage out most slip accidents and prevent most slip injuries.

People will suffer fewer needless slip accidents

People will be safer at work and in leisure activities such as swimming.

The Environment

There will be fewer poor quality floors installed that have to be replaced. There will be less damage done by ineffective anti-slip coatings. Environmentally friendly cleaning methods can be tested for effectiveness of cleaning and for the ability to maintain slip resistance.

What will change?...

(if TC339 adopt SlipAlert as a reliable measure of slip risk that monitors change)

Safer Flooring

Suppliers of quality flooring will be able to prosper. Commercial businesses will be able to buy floors with slip resistance appropriate for its intended use. Flooring manufacturers will gain valuable data on durability of slip risk in real use. Flooring manufacturers will be able to work with maintenance companies and clients to monitor changes to slip resistance over time and assess which changes are caused by poor cleaning, or wear or by inappropriate maintenance.

Safer New Floors

All new floors can be tested when laid. Many flooring companies already have SlipAlert and the cost per floor installed would be negligible. If all new floors are safe and fit for purpose that will in turn put pressure to maintain existing floors so they too are safe.

Extended life for good floors

Many good floors maintain or improve their slip resistance over time. However, poor cleaning or poor maintenance can make the floor present a slip risk. It will now be possible to measure the floor slip risk and test to see if the floor requires a deep clean.

Safety bodies able to work with commercial businesses

Safety bodies will be able to work more closely with commercial businesses. They will be able to share slip test data and work together. Slip test measurements can be compared to industry norms for the same type of floor or the same type of function.

Greater understanding of slip risks and the causes

As businesses and suppliers work together sharing slip test data, the knowledge and understanding of slip risks and how to manage floor safety will grow and grow.

There will be fewer slip accidents

For every serious slip accident there are (according to UK HSE) 40 minor slips. It will be possible to measure the slip resistance of all floors after any slip incident. It will be possible to compare the measure with earlier measures taken when the floor was laid or during annual risk assessments. In most cases small changes to floor safety procedures will make a big reduction in the numbers of slip accidents and slip injuries.

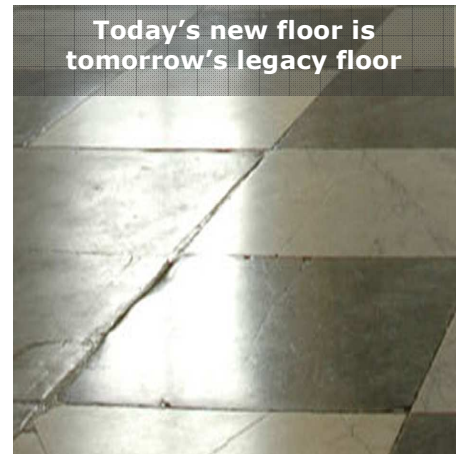
How safe are your floors?

We should all know which floors are safe.

Every New Floor Could Be Tested

Every new floor installed should be safe and fit for purpose. Every new floor should be tested for slip risk. The initial slip test made as soon as the floor is installed can be used as a reference. The results will confirm how safe the floor is, does it meet the required specification for wet and dry slip risk and is the floor fit for purpose.

With a benchmark test of slip risk measured when the floor is laid, it is now possible to monitor changes to the slip risk.



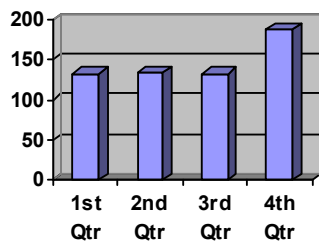
Change to slip risk: invisible contamination or wear



This floor may look clean, but there is an invisible area of contamination that increases the slip risk.

When SlipAlert measures an area of contaminated floor the results will be different from the benchmark measures normally achieved by the floor.

Monitoring Change and Managing Risk



Monitoring slip risk over time will help to identify any anomalies. In this example the floor has always measure around 130 STV which is a safe floor, yet on this occasion the measurement has risen to 188. The change could be an erroneous measure, or it could be indicating that the floor is not clean or has some form of contamination on the surface.

Monitoring change to slip risk is only possible if you have a reliable test method like SlipAlert. Monitoring slip risk over time has benefits in preventing slip accidents and also provides valuable information that can be shared with others to improve our understanding and ability to manage slip risk and reduce slip accidents.

You can test SlipAlert effectiveness

Repeatability and reproducibility

Simple test of repeatability Take 10 measurements of a clean dry floor and notice that SlipAlert gives almost identical results every time.

Repeatability and reproducibility: Three people each take two measurements of ten different floors. **Note:** all users should adopt the same test method:

- Use SlipAlert standard slider and wipe the slider with absorbent paper to ensure it is clean and dry between each test
- Check that SlipAlert wheels are turning freely and that it is switched on
- Ignore and re-do any tests where SlipAlert is not released correctly or where it has obviously left the ramp awkwardly because of misalignment on release
- For wet tests, ensure that the whole length of slide is wet (SlipAlert may stop sharply or spin if it hits a dry patch of floor)
- Record the 60 different measurements and compare each set of 6 measurements. Each of the six measures should be very similar. [Visit SlipAlert website](#) for how to calculate figures for reproducibility based upon your test results.

Accurately reflects real slip experience

- Test an area of clean dry hard floor (tiles, wood, vinyl or resin) – preferably a floor that is known to be safe (free from slip accidents)
- Test again with plain water on the floor
- Test again this time with oil spread across the dry surface then wiped – and then water applied on the oily surface
- SlipAlert should record three very different results. The dry result is likely to be safe, the wet result will be higher and probably in the medium risk category (unless it is a floor designed for wet areas like a swimming pool), and the third measure will almost certainly indicate high risk. Wipe the slider with dry paper between each test.
- With SlipAlert, this test can be done in seconds and the results will be a good indication of slip risk. No other test is as quick or as reliable.

Quickly and easily assess the effectiveness of cleaning

This test will confirm the ability of SlipAlert to identify any area of floor where the cleaning may have been poor or where an invisible slip risk is present on the floor.

Mark out six areas of clean dry hard floor each 2m long by 1m wide

Carefully spread oil on one area of floor and wipe with a cloth until it is not visible

Ask someone else to test the slip risk of each area of floor – being careful to wipe the SlipAlert slider with dry paper between each test.

Thank You

If you have read this far, we thank you for your interest in this important matter. If wish to try SlipAlert then please contact Andrew Stewart: andrew@slipalert.com

Definitions

PTV	Pendulum Test Value. PTV is roughly $100 * \text{CoF}$ (for values up to PTV 40). PTV 24 represents a slip risk of 1:20, PTV 36 represents a slip risk of 1:1 million. UKHSE advice suggests floors should be PTV 36 or better and commercial floors should not be below PTV 24. HSL measures show that over 70% of real floors tested fail to achieve PTV 36.
CoF	Co-efficient of Friction. Note: although many machines measure CoF in both wet and dry conditions the value of CoF measured by slow moving devices does not take into account the aquaplaning (<i>squeeze film</i>) effect that occurs during a pedestrian slip (foot moves at high speed $c: 1.6\text{ms}^{-1}$).
Dynamic/Static CoF	The coefficient of friction (horizontal/vertical force) required to move a weight across a floor surface. Static co-efficient = force required to start the block from stationary, dynamic = force required to keep it moving.
STV	SlipAlert Test Value. Measured on a scale from 100 – 240, the higher the value the greater the slip risk. STV 130 represents safe floor with slip risk below 1:1Million. STV 173 represents a slip risk of 1:20. Floors with PTV 173 when wet may be considered safe if they are normally maintained in dry conditions. Floors with wet STV greater than 173 represent a high risk if there is ever any chance of water on the floor.
Rz roughness	One of many microroughness parameters, Rz represents the peak to trough measure of microroughness. Since 2005 the UKSE has advised testing floors with SAT and Rz. Rz cannot accurately predict slip resistance (PTV) on real floors and cannot detect change to slip resistance caused by contamination or wear.
SAT	Slips Assessment Tool. A simplistic piece of software that takes Rz as its measure of slip resistance and weighs that with subjective measures of how the floor is cleaned, whether it is contaminated or not and produces a subjective measure of overall slip risk.
Slip Resistance of the floor	The Slip Resistance of the floor is the ability of the floor to resist slips. May be measured in PTV or CoF or STV.
Slip Risk	The slip risk is the risk (<i>probability</i>) of slipping on scale of 0 -1. The term "Slip Risk" may refer to the likelihood that a person could slip on the floor surface – e.g. slip risk of 1/1million is considered safe. The term "Slip Risk" may also refer to the overall risk (probability) of a slip occurring. The actual risk of slipping depends on the slip resistance of the floor along with other factors such as how many people walk on the floor, what they wear on their feet, how fast they walk, and what contamination is on the floor.

For more information on slip risk and other measures visit the [SlipAlert website](#).