



Floor and ground surfaces

When the choice of flooring material and design does not suit the tasks, possible contaminants or the people using the area, there is a high risk of slips, trips and falls.

Assess the risk

How flooring choice affects slip risks

The key issues to consider when assessing the suitability of the flooring are:

- smooth hard surfaces increase risk of slips
- contaminants on the floor further increases risk
- incorrect cleaning can make floors more slippery
- changes in the height of flooring can cause trips, including changes as small as 1cm or even less
- slips, trips and falls also occur between areas with different types of flooring material
- a floor that is slip resistant when dry may not be slip resistant when wet
- floor roughness is more effective than slip resistant footwear in reducing slips.

Checking existing flooring/surfacing

Essential factors to check for in existing flooring are:

- flooring that is uneven or in poor condition such as:
 - loose or curling matting, torn carpet, uneven or broken concrete, chipped/cracked tiles
- anti-slip paint, profile or tape that is worn, smooth or damaged
- areas of slipperiness under normal conditions:
 - there may be spots of flooring that are more worn or contaminated than other areas of same flooring e.g. high traffic areas, in front of deep fryer. Record this on a mud map of the area
 - some surfaces may look non slip but become slippery when wet or otherwise contaminated. Conversely some surfaces may look slippery or shiny, but are not slippery when contaminated
- flooring may have been originally chosen for a different purpose to how it is being used presently, so may no longer be suitable for its current use.

Objective measures of floor slipperiness

There are a number of certified methods to [assess surfaces for slip resistance](#) as outlined in relevant Australian Standards as well as other testing methods that can also indicate slipperiness of flooring e.g. roughness testers or sled tests.

These tests indicate the relative slipperiness of surfaces under different conditions, with some results reported in 'coefficient of friction'. For example:

- a coarse bitumen surface will have a high coefficient of friction and will not be slippery and is likely to be safe for rapid walking
- an icy surface will have a very low coefficient of friction and will be extremely slippery, requiring extreme caution.

There is no one 'correct' or 'safe' level of slip resistance as it depends on the interaction of many factors including the type of floor surface, contaminants, work tasks, cleaning method, who is walking in the area, their footwear, their activity and environmental conditions. This is achieved through use of a risk management approach.

Decide on control measures

Selecting the most appropriate flooring and keeping it well maintained will significantly reduce risk of slips, trips, and falls. Check what you can do to further improve your flooring.

Install the right flooring or surfacing

Ask your supplier for data on suitable flooring for your workplace. For example, processes that use thick/high viscosity fluids will need flooring with significant grip, such as rough or highly profiled surfaces. Suppliers should be able to provide comparative data on slip resistant properties of a range of products under dry and wet/contaminated conditions.

Refer to [Flooring types – characteristics & applications](#) for more information.

When choosing flooring products:

- consider expected use conditions and expected users
- consider materials with grip when both wet and dry
- select materials for the tasks and typical wear
- check the cleaning requirements of the flooring
- ensure floor heights and surfaces are consistent.

The interactive online [HSE Slips Assessment Tool](#) can assist in selecting the best flooring for different applications

Maintain the flooring

As well as having flooring materials correctly installed or laid, ongoing maintenance is important, and this may include repairing or replacing the surface.

Key factors in looking after flooring are:

- maintain the slip resistance with the right cleaning method

- fix any changes in heights
- repair torn carpet, curling mats, uneven or broken concrete, chipped/cracked tiles
- where floor/surface cannot be fixed immediately, highlight any height or surface changes with contrast colours or strips (e.g. yellow/reflective paint or tape)
- remove any loose matting
- improve slip resistance with surface treatments if required (see table below for options)

Improving slip resistance of existing flooring/surfacing

These are possible options for improving the slip resistance of existing flooring and surfaces:

Treatment type	Typical application for use
Adhesive strips	Applicable to all flooring types. Mineral-coated adhesive strips are useful for localised slip hazards such as stair treads and ramps. However, they wear quickly and should be considered as a temporary solution or receive regular replacement
Coatings	Applicable to concrete, clay pavers, steel plate and timber. A range of base materials is used including acrylics, flexible polymers, polyester resin, vinyl ester resin and epoxy resin. For the best slip resistance the coatings include some aggregate such as rubber particles, silica sands and silicon carbide granules. These treatments can be tailored to the application depending on the level of chemical, traffic or slip resistance needed. With the right aggregate, slip resistance under oily conditions is quite feasible
Grinding	Applicable to concrete, ceramic tiles, granite, marble, terrazzo and clay pavers. This treatment can give a rougher surface, so it can be used to give slip resistance under oily conditions
Grooving with diamond saw	Applicable to concrete, ceramic tiles, granite, marble, terrazzo and clay pavers. For example, grooves 2–3 mm deep, spaces at 7–10 mm would give slip resistance under oily conditions. Loss of the sealed surface could lead to staining
Proprietary treatments such as a mild etch	Applicable to ceramic tiles, granite, terrazzo, clay pavers and vinyl. They may increase slip resistance but the tile may still be too slippery, particularly for soapy water. The treatment would be ineffective for oily conditions. The effectiveness has also been found to deteriorate after a few months, requiring repeated applications
Sand blasting	Applicable to concrete, ceramic tiles, granite, marble, terrazzo, clay pavers and steel plate. Oil can still make the surface slippery

Strong acid etches	Applicable to concrete. Should make it suitable for slip resistance with water but not with oil
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