

# Design and preparation of substrates for UCRETE<sup>®</sup> industrial flooring

## Introduction

This bulletin is intended to assist consultants, architects and specifiers in the correct design and preparation of substrates to accept UCRETE industrial flooring.

As with all such materials, UCRETE industrial flooring will only provide optimum performance if applied to properly prepared, sound, stable, clean and dry substrates. Time and care spent in considering substrate design and preparation will help to ensure that the end-user is provided with a floor that gives optimum performance and maximum service life.

## Specialist applicators

UCRETE industrial flooring is laid *only* by applicators licenced to use the UCRETE trade mark and fully trained in the correct mixing and application procedures.

All of our applicators are specialist flooring companies and their advice should be sought at an early stage when considering specific substrate requirements. Their advice, based on experience with our system, may eliminate much unnecessary and expensive additional work.

## Substrate types

UCRETE floors are most frequently laid onto concrete or polymer-modified screeds. Other suitable substrates are:

- cementitious terrazzo surfacing
- previously laid UCRETE floors
- mild steel
- exterior grade plywood (25 mm marine ply)
- unreinforced sand/cement screeds (UCRETE SL only)

Other substrates may be suitable; consult your specialist applicator or local MBT Ucrete office for advice.

Some substrates are known to be unsuitable. These include:

- asphalt/bitumen
- smooth non-porous tiles and bricks
- magnesite

- galvanised steel
- stainless steel
- copper
- aluminium
- wood (except exterior grade plywood)
- aerated or foamed concrete blocks
- unreinforced sand/cement screeds (except for UCRETE SL)

## Design and preparation of concrete substrates

### Floor base/slab

In general, concrete bases and screeds should be constructed in accordance with BS 8204: Part 1 (1987), *Code of practice for concrete bases and screeds to receive in-situ flooring*, and established engineering practices, including provisions for movement joints and membranes where necessary.

### Expansion joints

All expansion and crack propagation joints formed in the floor base *must* be carried through the UCRETE floor and it is advisable, when forming expansion joints around columns and equipment set in the floor, to include radial corners to avoid stress-creating angles. A minimum 5cm radius is advised.

Two typical joint details are shown below.

Figure 1: Expansion joint

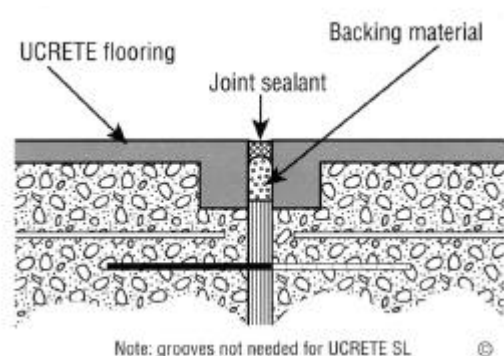
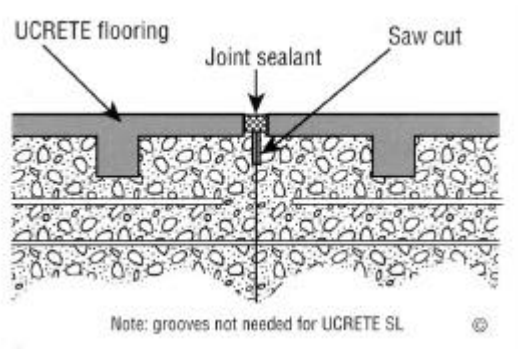


Figure 2: Induced joint



Experience has shown that it is normally advantageous to form expansion joints in the base floor around areas, which may be subjected to thermal or vibrational movement in service.

Typical situations include:

- boundaries between different floors or flooring materials
- load supporting columns set in the floor
- vessel sealing rings
- areas around ovens and other process equipment

#### Damp-proof membranes

A damp-proof membrane is essential where rising moisture may cause the concrete to remain damp for prolonged periods and adversely affect the bond to the UCRETE floor.

UCRETE flooring, although effectively impermeable to liquids, must not be used as a substitute for a membrane or vapour barrier.

Where a damp-proof membrane is used, it must be incorporated within the base concrete and not laid directly beneath the UCRETE floor.

#### Screeds

Topping screeds for concrete bases are often used as substrates for UCRETE flooring, where additional falls etc. are required. These can be of two types:

- fine concrete
- polymer-modified sand/cement.

It is recommended that screeds in areas subjected to hot water spillage should contain a fine aggregate (6-10 mm).

#### Preparation/general requirements

- Floor bases and screeds, which are to receive UCRETE flooring should be of sufficient strength. This is best checked by carrying out a tensile or pull-off test. A tensile strength of 1.5 N/mm<sup>2</sup> is required. UCRETE floors may be applied to substrates of lower strength but the long-term performance of the floor may be affected.

- Waterproofing additives should not be included in screeds unless their compatibility with UCRETE flooring has been checked.
- Any laitance present on the concrete surface must be removed by mechanical methods (see below) before UCRETE flooring is applied, otherwise delamination will occur. For this reason, it is recommended that a wooden float is used to finish a new screed as steel trowels invariably produce excessive laitance.
- Existing screeds may be contaminated with mould-release oils, chemical spillage or previously applied coatings. Contaminated concrete must be removed before the application of UCRETE flooring if a good bond is to be obtained. Preferred methods of removing contamination are:
  - Blastrac or similar equipment
  - air-impact hammer (scabbier) - provided that the sub-floor is not damaged
  - concrete surface planer
  - abrasive blasting
  - wire-brush scarifier
  - surface grinder
  - drum sander
  - flame spalling may be satisfactory in some situations

Acid etching is not reliable *and is not recommended*.

- After treatment, all dust and loose particles should be removed from the whole surface, including cracks and grooves. Vacuum cleaning is the most effective method.
- Standing water must be removed completely by absorption in sawdust followed by drying with a hot-air blower, infra-red heater, or flame gun.
- The substrate must be visibly dry. UCRETE SL is more sensitive than other grades to moisture content. A maximum moisture content of 4% measured by the CM test method is essential before UCRETE SL is applied.

#### Holes/cracks

Any holes or cracks greater than about 25 mm deep should first be filled in with concrete or UCRETE flooring. Smaller irregularities will be filled or sealed during the application of the UCRETE flooring.

#### Tolerances

UCRETE flooring, in general, should not be relied upon to improve the tolerances of flatness levels in the substrate. The substrate should be applied to the appropriate tolerances prior to the application of UCRETE flooring.

### Falls

These should be formed in the screed in accordance with good building practice or, in the case of polymer-modified screeds, to the manufacturer's instructions with special attention being paid to minimum thicknesses.

When there are severe limitations on time, UCRETE flooring itself may be used to form falls or fill deep holes by bulking UCRETE HF100 or UCRETE UD200 grades with coarse (10 mm grading maximum) hard, dry acid-resistant aggregate. Gravel, flint or granite are suitable. Consult a specialist applicator for details.

### Coves

These should be formed in fine concrete to the same standard as the screed. Typical cove details are shown in Figures 3 and 4.

Figure 3: Floor-to-wall joint

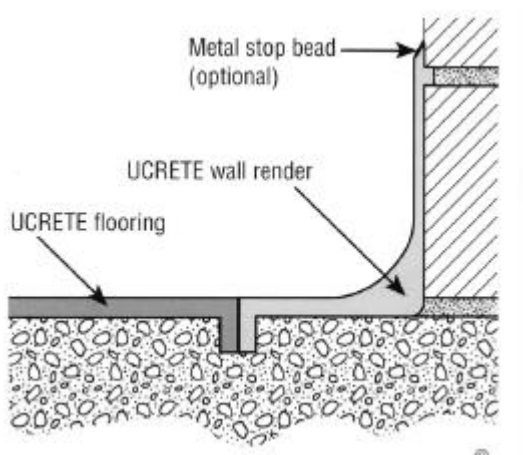
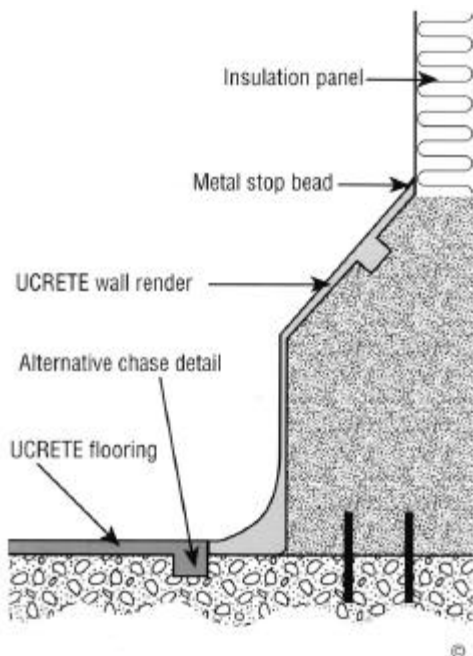


Figure 4: UCRETE WR to concrete kerb



### Areas around ovens

Floor areas subject to high temperatures and thermal cycling need special attention. The oven area should be isolated from the surrounding floor by an expansion joint. It is good practice to lay clay tiles in this oven area with a heat shield immediately under the ovens.

Where hot steel-wheeled trolleys are removed from ovens onto UCRETE flooring, it is recommended that dairy grids are incorporated into the UCRETE floor.

### Cold rooms

The areas within a cold room should be isolated from the surrounding floor by an expansion joint. Within a cold room the Concrete Society recommends that bays have an aspect ratio as close to one as possible. The bay joints must be carried through the UCRETE floor. In cases where the concrete floor is not laid onto an insulating layer, additional movement joints may be necessary.

### Edge details

Wherever a free edge of UCRETE flooring will occur, for example, around the perimeter, along channels or expansion joints, at doorways and around machinery plinths and columns, extra anchorage must be provided to help to distribute mechanical and thermal stresses arising from shrinkage and temperature changes.

This is achieved by forming or cutting a groove in the concrete, with a depth and width about twice the thickness at which the UCRETE flooring will be applied, using a diamond cutting wheel. Suggestions for various situations are shown in Figures 5 to 7.

- On a new floor, grooves are formed by inserting polyethylene-coated timber strips into the concrete at the time of laying.
- Grooving has the additional important advantage of reducing the possibility of liquids seeping under the UCRETE floor and affecting the bond to the substrate.

Figure 5: Final edge to original level

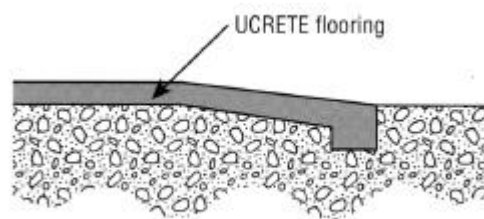


Figure 6: Final edge for example doorway

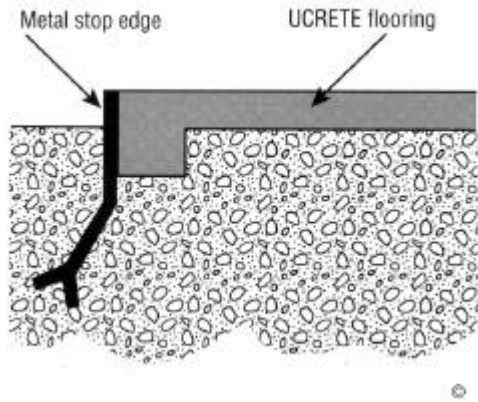
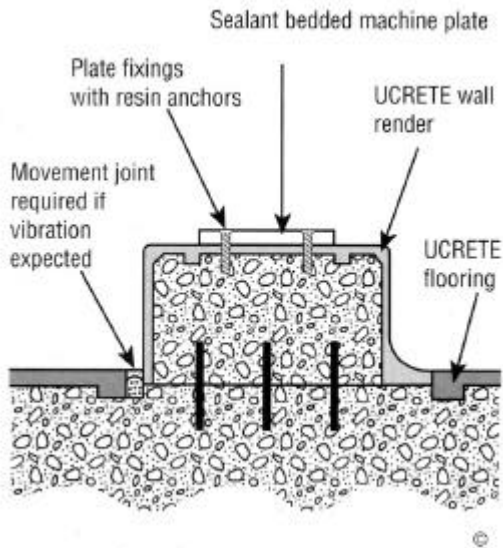


Figure 7: Machine plinth coated with UCRETE



Note: Anchoring grooves are normally unnecessary with UCRETE SL.

**Drains and channels**

Details of UCRETE floors laid to three different types of drainage channel are shown in Figures 8 to 10.

Figure 8: Stainless steel drainage channel

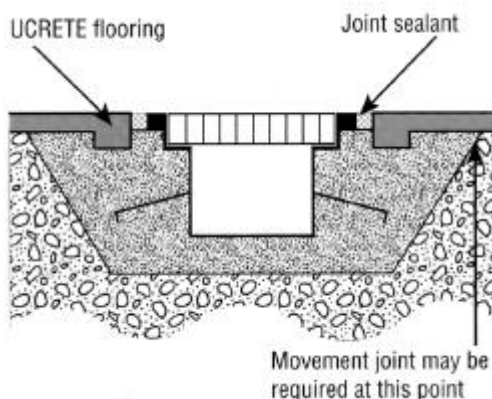


Figure 9: Lined channel

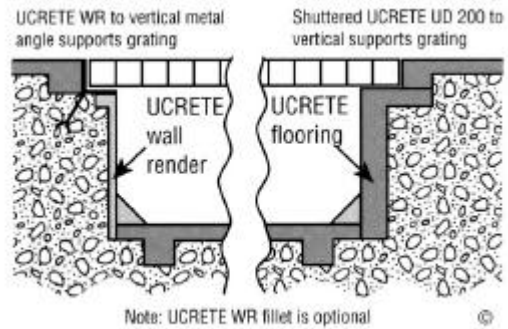
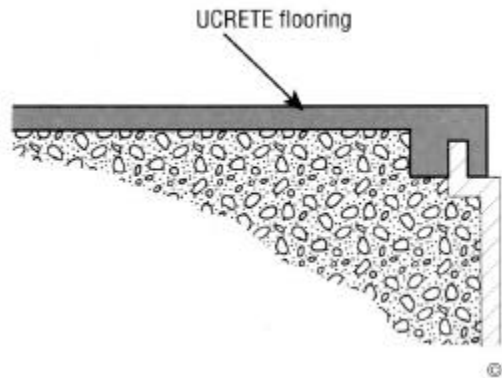


Figure 10: Edge detail to glazed drain gully



**Priming**

It is essential to prime surfaces to prevent air causing defects in the finished floor. The most appropriate method of priming will depend upon a number of factors including the surface roughness of the substrate, the grade of UCRETE flooring to be applied and the intended end use.

Note: Poor quality or contaminated substrates cannot be made satisfactory by priming.

**Design and preparation of other substrates**

Where appropriate, the foregoing recommendations for concrete substrates also apply to other suitable substrate materials. Additional special points are as follows.

**Mild steel, for example, Chequer plate**

All paint, grease, rust or scale must be removed by grit blasting or thorough wire brushing to ensure an adequate bond when UCRETE flooring is applied.

Metal strips should be welded onto the edges of the steel plates to protect the edges of the UCRETE floor.

### **Exterior-grade plywood**

The exterior-grade plywood should be at least 25 mm thick. The boards must be securely fixed with screws at 50 cm centres and the joints covered with polyester cloth or jute scrim cloth. The surface should be sanded lightly and dusted. Provided the board is dry, UCRETE flooring can then be applied in the normal way.

### **Previously laid UCRETE flooring**

The substrate must be sound and the previously laid UCRETE floor well bonded to it and free from chemical attack or contamination. The surface should be roughened with a drum sander or scarifier and all dust removed. New UCRETE flooring can then be laid in the normal way.

## **MBT Feb UK Version 1**

### **Health and Safety**

\*For full information on Health and Safety matters regarding this product the relevant Health and Safety Data Sheet should be consulted.

The following general comments apply to all products.

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs, (which may also be tainted with vapour until the product is fully cured and dried). Treat splashes to eyes and skin immediately. If accidentally ingested, seek medical attention. Keep away from children and animals. Reseal containers after use.

### **Solvent Based Products**

Use in well ventilated areas; avoid inhaling. Suitable respiratory equipment may be needed, eg when spraying. Can cause skin, eye irritation. Wear protective eye shields and gloves during use. Do not smoke or allow sparks or naked lights when stored or in use.

### **Powder Products**

Should be handled to minimise dust formation; use light mask if excessive dust unavoidable. Cement powders when wet or moistened can cause burns to skin and eyes which should be protected during use.

### **Resin Products**

Can cause irritation, dermatitis or allergic reaction. Use protective equipment particularly for skin and eyes. Use only in well ventilated areas.

### **Spillage**

Chemical products can cause damage; clean spillage immediately.

### **Disclaimer**

The information given here is true, represents our best knowledge and is based not only on laboratory work, but also on field experience.

However, because of numerous factors affecting results we offer this information without any guarantee and no patent liability is assumed.

All products should be used in accordance with the Manufacturer's instructions. No responsibility can be taken by the manufacturer where conditions of use are beyond our control.

It is the responsibility of the user to obtain the most up-to-date datasheet which supersedes all previous literature.

For additional information or questions, contact your local MBT Feb representative.