

# TECHNICAL BULLETIN – TB187

## APPLICATIONS OF SMOOTHING CEMENTS AS HARD-USAGE WEAR SURFACES

Date, Wednesday, 16 July 2014

### INTRODUCTION & SCOPE

This bulletin discusses the requirements for the installation of smoothing cements as wear surfaces, and in particular, industrial floors, pathways, verandahs, roofs and car parks.

The application of smoothing cements into these areas, requires special considerations. These considerations include;

- External or internal conditions
- Type of traffic encountered
- Appearance of the floor, surface hardness and slip resistance
- Construction style - substrates
- The presence of joints and cracks
- Falls to prevent ponding water
- Weather conditions on the day of installation and initial cure period

### EXTERNAL OR INTERNAL CONDITIONS

There is a sharp delineation between the products recommended for these two conditions.

#### Dry Internal Applications

The recommended smoothing cement is *ARDEX K80* with *ARDEX WPM300 + Broadcast sand* as the primer/ moisture barrier system.

Thickness range 5-50mm neat (the maximum thickness is not restricted).

Above 10mm thickness it is recommended to be mixed with 2-5mm aggregate.

#### External Applications/Internal Wet Applications

The recommended smoothing cement is *ARDEX K301* with *ARDEX WPM300 + Broadcast sand* as the primer/ moisture barrier system.

The recommended thickness range is 2-20mm neat and 30mm when mixed with 2-5mm aggregate.

#### Notes

Ardex WPM300 can be substituted with Ardex Abapoxy or Ardex EP2000.

In some situations, a light coat of Ardex P51 diluted 1:3 with water can be applied over the broadcast sand for internal applications to reduce the risk of surface antholing.

### TYPES OF TRAFFIC

The smoothing cements are designed to easily take pedestrian traffic and also vehicle traffic, such as cars and normal trucks. K80 is also intended to take forklift traffic in a warehouse situation.

However, it has to be recognised that whilst the smoothing cements have high ball pressure hardness and will withstand being driven over, highly concentrated point loads (e.g. narrow steel or hard plastic wheels), and twisting-shearing loads (such as turning of



wheels by stationary vehicles) will still mark and wear the surface. These smoothing cements are not suitable for use with tracked vehicle areas.

Where the surface is likely to suffer increase wear or damage, it is recommended that the smoothing cement be covered with a high build epoxy or polyurethane coating. These products have high compressive strengths and good resilience.

#### **APPEARANCE OF THE FLOOR, SURFACE HARDNESS AND SLIP RESISTANCE**

Where smoothing cements are applied as the wear surface, either 'natural' or clear sealed, it is unusual to achieve a truly homogenous surface. Slight colour variations, and trowel swish marks are common and this needs to be taken into account if aesthetics are a consideration.

The surface hardness of the smoothing cements is roughly equivalent to a good hardwood surface, so dragging sharp objects over the surface will gouge and scratch it (for example pallets with protruding nails and metal edged containers).

The slip resistance of smoothing cements is typically around Rating 9. The surfaces cannot be 'broom finished', so increased slip resistance requires the application suitable coatings, which may include grits.

Ardex K80 is mid-dark grey in colour, and when sealed becomes several shades darker. It is not the same colour as 'normal' concrete.

Ardex 301 is a creamish-pale grey colour, and is again, dissimilar to 'normal' concrete.

#### **CONSTRUCTION STYLE - SUBSTRATES**

The only recommended substrate for these smoothing cements is sound and porous concrete. Surfaces such as pavers, cobbles and tiles are not suitable.

The preferred situation is a slab-on-ground type of construction. Where the substrate is a suspended and/or post tensioned slab, it needs to be rigid enough not to flex, and also not transmit continuous vibrations. Depending on the loads applied to the floor, if significant flexure and continuous vibrations are present, the topping may develop cracking over time.

#### **THE PRESENCE OF JOINTS AND CRACKS**

**Ardex does not recommend the filling of construction joints, mobile joints or cold joints with smoothing cements. Cracking of the smoothing is an inevitable consequence of such a course of action. Joints must be continued through the topping surface and filled with suitable flexible sealants.**

Where the substrate contains active cracks, either from shrinkage or movement, these will normally telegraph through the smoothing cement and appear on the surface. This usually leads to mainly aesthetic issues, but if the cracks are large enough, it can result in gradual breakdown of the top surface of the smoothing at the crack site where loads cross the crack.

Smoothing cements are not structural and so not designed to rectify problems with poorly poured and engineered slabs.

#### **FALLS TO PREVENT PONDING WATER**

Where external surfaces are smoothed, it is important that falls to waste and drainage are maintained to prevent ponding. It needs to be recognised that K301 is self smoothing cement and does flow (i.e. down slopes), so careful design is required. The addition of aggregate (2-5mm) will reduce the flow properties, but also creates a rougher surface texture.

#### **WEATHER CONDITIONS DURING INSTALLATION AND CURING**

External applications are subject to the capriciousness of the weather. High winds and hot conditions will result in poor working times, premature drying and surface skinning. The last two points can and do produce shrinkage related cracking. It is not recommended to install

smoothing cements above 35°C in general, but in external environments a lower cut off temperature may be required since the 'in sun' temperature is often 5-10 degrees higher.

Where rain falls onto smoothing cements that have not properly cured (at least 16hrs) there is the risk of softening and weakening of the smoothing cement. Ponding of water during the cure phase is especially damaging to the cement properties.

Cold conditions will slow the cure and hardness development of the smoothing cement. Below 10°C the cure rate is reduced significantly, and at 5°C the reaction effectively stops. If the temperature falls much below 0°C ice crystals may form in wet-uncured smoothing cement leading to matrix damage.

**IMPORTANT**

This Technical Bulletin provides guideline information only and is not intended to be interpreted as a general specification for the application/installation of the products described. Since each project potentially differs in exposure/condition specific recommendations may vary from the information contained herein. For recommendations for specific applications/installations contact your nearest Ardex Australia Office.

**DISCLAIMER**

The information presented in this Technical Bulletin is to the best of our knowledge true and accurate. No warranty is implied or given as to its completeness or accuracy in describing the performance or suitability of a product for a particular application. Users are asked to check that the literature in their possession is the latest issue.

**REASON FOR REVISION**

24 month review.

**MAXIMUM REVIEW DATE**

24 months from issue DH.

**NSW** 02 9851 9100, **QLD** 07 3817 6000, **VIC** 03 8339 3100, **SA/NT** 08 8406 2500, **WA** 08 9256 8600

**New Zealand** (Christchurch) 64 3384 3029

Web: <http://www.ardex.com> email: [technicalservices@ardexaustralia.com](mailto:technicalservices@ardexaustralia.com)

