

PREPARATION OF SUBFLOORS

The quality of a finished installation can be very much dependent upon the preparation of the subfloor and the attention paid to the recommendations made in various codes of practice and by the manufacturers of the component parts. The information contained below is given as guidance, based on many years of experience in this field.

It is important to avoid problems at the outset. If you are unsure of any of the information listed below, we recommend that you contact the Polyflor Customer Technical Support Team, either directly in the UK, through your local distributor for other countries or through the 'Technical Support' website link. Alternatively, discuss your requirements with your preferred supplier of smoothing compounds and adhesives.

1. NEW CONCRETE AND SCREED BASES

The most common cause of failure in these types of substrate is moisture, either as construction moisture or the lack of an effective moisture barrier on direct to earth subfloors.

1.1 Damp proof membranes (DPMs)

All concrete bases, which are direct to earth, must have an effective damp proof membrane incorporated within them. It should only be considered if the perimeter edges are continuous with the DPM in the walls.

A continuous polyethylene sheet 0.12mm (500 gauge) will provide an effective DPM for both monolithic and bonded screeds. The DPM should be

applied over surface blinded hardcore to provide an even, smooth finish and to prevent puncturing of the membrane. All joints should be welded and then weighed down until the floor is cast.

With unbonded screeds, where there is risk of damage by subsequent screed laying operations, polyethylene sheet twice as thick (1000 gauge) should be used. All joints should be welded and then weighed down until the screed is applied.

Protection of structures against water from the ground is described in BS 8102 and the various types of DPM are described in BS CP 102 together with their applications. Some DPMs contain volatile components, which can, if not eliminated, adversely affect the adhesion of the floorcovering. Advice should be sought from Polyflor before any DPM of this type is specified.

2. CONSTRUCTION MOISTURE

Prior to laying any Polyflor vinyl and rubber flooring, it is essential that all free water, which can affect adhesion, be allowed to evaporate from the base. The rate of drying is influenced by many factors including design of the base, ambient temperature and humidity, concrete quality, amount of construction water used, surface finish attained, use of special concrete additives and especially the thickness of the base. Because of this variability, it is difficult to give exact drying out times but, as a guide, allow one month per 25mm for the first 50mm and an increasing time for each millimetre above this thickness.

A base 150mm thick in monolithic construction, drying from one face only, can take up to twelve months to dry sufficiently to take a floorcovering.

If it is obvious at the planning stage that there will be insufficient drying time, then the situation should be discussed with Polyflor, who can offer several proven alternatives to suppress the construction moisture.

3. MOISTURE TESTING

Polyflor vinyl and rubber flooring should only be laid on subfloors which do not suffer from rising damp or hydrostatic pressure, and where the moisture level does not exceed 75% RH in accordance with BS 8203.

The Hygrometer is the only method of test acceptable to Polyflor, and only readings taken over at least a 72 hour period should be considered to represent the moisture content of the subfloor.

Subfloors with a relative humidity in excess of 75% will invariably cause failure of the bond between the substrate and floorcovering. To remedy such situations, the whole floorcovering will have to be removed, the subfloor treated to resolve the moisture problem and a new floorcovering laid. In an occupied building, this can cause severe disruption to the work routine.

To prevent these situations arising, Polyflor does not condone the practice of laying vinyl and rubber floorcoverings on subfloors with moisture content readings above 75% RH and accepts no responsibility for non-performance of Polyflor products in such instances.

In countries outside of the UK, alternative moisture measurement methods are also used. The guidelines for the maximum acceptable vapour emission rate of concrete using anhydrous calcium chloride is 3lbs per 1000 square feet per 24 hour period for all the

Polyflor and Polysafe floorcoverings, except for the Polyflex VC Tile where the maximum vapour emission rate is 5lbs.

4. EXISTING CONCRETE AND SCREED BASES

Existing concrete and sand/cement screed bases, as described in BS 8204, if laid directly to ground must contain an effective DPM. If one is not present or is suspect, consult Polyflor for advice on suitable surface applied DPMs.

Existing bases must also be free of all contamination, which would impair adhesion of a floor smoothing underlayment or floorcovering. All contamination must be removed before further work proceeds.

In most instances, a cementitious smoothing compound of at least 3mm thickness must be applied prior to the installation of the vinyl floorcovering. The smoothing underlayment supplier will provide details on which product within their range must be used to suit the end use application and subfloor construction, together with details of which primer should be used.

5. POWER FLOATED CONCRETE

Power floated concrete bases, as described in BS 8204, if laid directly to ground must contain an effective DPM. If one is not present or is suspect, consult Polyflor for advice on suitable surface applied DPMs. Smooth dense concrete subfloors - such as those created by a power floated finish - can prove difficult to bond to, due to the impervious nature of the surface. In such instances, the floor should initially be ground or blasted to remove the top surface and then made good.

In most instances, a cementitious smoothing compound of at least 3mm thickness must be

applied prior to the installation of the vinyl floorcovering. The smoothing underlayment supplier will provide details on which product within their range must be used to suit the end use application and subfloor construction, together with details of which primer should be used.

Surface hardeners or curing agents should not be used with power floated concrete, as these can also impair the adhesion of the floorcovering.

6. MASTIC ASPHALT UNDERLAY

Mastic asphalt underlays as described in BS 8204: Part 5: 1994 should conform to BS 6925: 1988.

Comprising of asphaltic cement and suitable aggregates, the asphalt is applied in its hot state onto a glass fibre quilt. Normally a thickness of 15mm to 20mm is applied and the asphalt brought to a finish with a wooden float. The resulting underlay is impervious to moisture and, if continuous with the DPM in the walls, makes an excellent subfloor for Polyflor vinyl and rubber flooring, providing a 3mm thick surface underlayment is first applied. It is important to ensure that the smoothing underlayment is of a type recommended for use on asphalt floors and that a suitable primer key coat is applied, if so directed.

Never apply Polyflor floorcoverings direct to a mastic asphalt subfloor.

7. MAGNESITE/GRANWOOD FLOORS

Composition floors which are composed of magnesium oxychloride cement or polyvinyl acetate/cement are highly absorbent. As such, if overlaid with an impervious material, they can break down due to the effects of rising moisture, as the majority of these floors do not incorporate an effective DPM. In all instances where the material is laid directly to ground, Polyflor recommend that the

screed be uplifted and relaid incorporating an effective DPM.

For floors that are on the first floor or above, cracks and small hollows should be patch filled and a cementitious smoothing compound of at least 3mm thickness must then be applied, prior to the installation of the vinyl floorcovering. The smoothing underlayment supplier will provide details on which product within their range must be used to suit the end use application and subfloor construction, together with details of which primer should be used.

8. TERRAZZO

Terrazzo has a dense hard surface, which is normally impervious. The floor must be sound and firmly fixed and any loose or powdery material removed from the joints. The surface should be thoroughly washed/degreased to remove any surface contaminants and any cracks cleaned out and filled with a suitable resin bonded cement/sand mixture. The surface may also need some mechanical abrasion to enable the smoothing underlayment to key to the surface.

In most instances, a cementitious smoothing compound of at least 3mm thickness must then be applied prior to the installation of the vinyl floorcovering. The smoothing underlayment supplier will provide details on which product within their range must be used to suit the end use application and subfloor construction, together with details of which primer should be used.

9. QUARRY TILES/CERAMIC TILES

Heavily glazed surfaces are quite common with these types of flooring and tiles must be sound and firmly fixed with all loose and powdery grout removed from the joints. Generally the tiles will

require mechanical abrasion of the surface in order to provide a key for the application of a smoothing underlayment. The surface should be thoroughly washed/degreased to remove any surface contaminants and then a cementitious smoothing compound of at least 3mm thickness must then be applied prior to the installation of the vinyl floorcovering. The smoothing underlayment supplier will provide details on which product within their range must be used to suit the end use application and subfloor construction, together with details of which primer should be used.

10. SYNTHETIC ANHYDRITE SCREEDS

This type of screed can be affected by laitence and moisture in the smoothing compound, resulting in the loss of bond. As such, it may need mechanical removal and the application of a special primer. We would always recommend that you discuss this application with your adhesive and underlayment manufacturers. If a failure occurs, it is normally below the vinyl floorcovering and as such Polyflor will not accept responsibility for failure.

11. EXPANSION JOINTS

Expansion joints are incorporated into buildings to permit movement without cracking. It is important that these joints extend through the floorcovering. **Never lay Polyflor vinyl and rubber flooring over expansion joints.**

Proprietary expansion joint covers are available which blend with the floorcovering and disguise the joint. Some are made of vinyl that incorporates a flexible portion and are welded to the abutting vinyl to form an impervious layer. Other types are a combination of aluminium and PVC, which again contains a flexible section. Advice on suitable,

approved products can be obtained from Polyflor. See 'Recommended Finishes' pdf for more details.

Filling the expansion joint with sealant which is not specifically designed for expansion joint filling or floor smoothing underlayment will lead to floor failure and is not recommended by Polyflor.

12. TIMBER SUBSTRATES

New timber suspended floors should be constructed of either plywood or chipboard specifically manufactured for flooring. Spacing of the supportive joists should be in accordance with the manufacturer's recommendations in relation to the board's thickness.

12.1 Chipboard

Chipboard should have a minimum thickness of 18mm and a density not less than 700kg/m³. Preferred sizes are 600mm x 2400mm and 1200mm x 2400mm.

The chipboard should be tongued and grooved or slotted loose tongue fitting. All joints should be glued for accurate location and finished level. The board edges must be supported across the joists and where necessary by the use of noggins. The boards should be fixed at 350mm centres using annular (ring shanked) nails, lost head nails, divergent staples or countersunk screws, of length at least 2½ times the thickness of the board.

For joist centres up to 450mm, 18mm thick chipboard can be used. For joist centres of 610mm, 22mm thick chipboard should be used. All chipboard should comply with BS 5669 and should be free of sealants or coatings, which are liable to adversely affect adhesion of the floorcovering, if applied directly to it.

Boards must be conditioned on-site by loose laying them individually or loose stacking them in the temperature and humidity conditions which will prevail in service, for at least 3 days prior to fixing. Boards with a moisture content of less than 7% and greater than 18%, using an electrical resistance moisture meter, should not be laid.

12.2 Chipboard floating floors

Wood chipboard incorporating a laminated foam backing, or loose laid insulation quilting or similar, and used as an underlayment for floorcoverings, should comply with the requirements of BS 5669: 1989, Part 5. The chipboard must not have been coated with any type of sealer which makes the surface impervious, such as wax or polyurethane, as they will impair the bonding of the adhesive to the floorcovering.

Boards must be conditioned on site, by either loose laying them individually or loose stacking them in the temperature and humidity conditions which will prevail in service, for at least 3 days prior to fixing. Boards with a moisture content less than 7% and greater than 18%, when measured with an electrical resistance moisture meter, should not be used.

All nail and screw heads must be below the surface of the board, and any indentations filled with a suitable flexible underlayment. The surface should be primed using a primer which is recommended by the adhesive manufacturer and applied in accordance with their instructions. The primer will minimise adhesive usage, prevent preferential absorption and maintain the open time of the adhesive.

Floating floors are designed to allow movement in both the vertical and horizontal planes. Problems can occur at the joints of the chipboard where

movement in either plane is excessive. It is Polyflor's recommendation that the boards should be overlaid with flooring grade plywood with a minimum thickness of 4mm, with the plywood laid half bonded over the chipboard joints, stapled or nailed as described in Section 12.6.

12.3 Plywood

Plywood should be grade "good one side" specification CSA O121 sanded. The boards should be 1200mm x 2400mm and of minimum thickness 15.5mm.

The boards should be laid with the longer side at right angles to the joists and the shorter side must have solid bearing on the joists. Fixing should be carried out at 300mm centres with annular (ring-shanked) nails or lost head nails of length at least 2½ times the thickness of the board or divergent staples. For joist centres up to 450mm, 15.5mm thick plywood can be used. For joist centres of 610mm, 18mm thick plywood should be used as described in Section 12.6.

12.4 Wood blocks

Although many woodblock floors appear sound, even when overlaid with plywood, the application of an impervious floorcovering on a direct to earth subfloor can cause expansion and lifting of the base. Polyflor recommends that, in all cases, the woodblock floor be removed and the subfloor brought up to the required standard to accept Polyflor vinyl and rubber flooring.

12.5 General

All nail and screw heads must be below the surface of the board and any indentation filled with a suitable flexible underlayment, as should the joints between any boards that have been used to overlay the existing floor. The surface should be primed using a

primer compatible with the adhesive, as recommended by the adhesive manufacturer. The primer will minimise adhesive usage and maintain the open time of the adhesive and prevent preferential absorption.

12.6 Existing wooden floors

Existing wooden floors may have received a preservative treatment that will cause poor bonding, due to a chemical interaction between the preservative and the adhesive. In such cases, they should not be laid onto directly.

All loose boards should be firmly nailed to the joists and any worn or broken boards replaced. The floor should be sanded to remove high spots and any hollows or cracks filled with a suitable flexible underlayment.

The existing wooden floors should then be overlaid with exterior grade WBP plywood of 4mm or 6mm thickness and preferred size 1200mm x 1200mm. The boards should be laid with staggered joints with a 1mm gap all round to allow for expansion. The plywood should be fixed to the existing boards using 18mm long divergent staples or 14 gauge GKN screw nails of 25mm length. Both types of fixing should be at 100mm centres along the edge of each sheet, with a fixing line 12mm from the edge and thereafter at 150mm centres throughout the entire area of the sheet. Perimeter fixings must not be more than 18mm from the board edges.

Hardboard manufactured to BS 1142 can be used as an alternative to plywood. Preferred sizes are 1200mm x 1200mm x 3.2mm thick. It should be noted that hardboard can suffer from extreme dimensional change when in contact with water. To minimise this change, the hardboard should be wetted on the mesh side and left overnight to dry,

prior to fixing. Failure to wet the hardboard can result in buckling due to moisture absorption from the water-based adhesive.

Plywood and hardboard should be treated as described in Section 12.3 prior to application of the floorcovering.

With suspended timber at ground level, it is of vital importance to obtain good ventilation below the floor through the existence of airbricks. Without good ventilation, the application of an impervious floorcovering could lead to dry rot in the structure beneath.

Most smoothing compounds are unsuitable for applying to timber bases due to the movement of the base. Seek advice from the smoothing underlayment manufacturer for the correct grade of product for your specific application.

Cementitious smoothing compounds should only be used to patch fill hollows on timber substrates. Once level, they should be overlaid with flooring grade plywood, as described previously.

13. OTHER SUBSTRATES

13.1 Metal bases

Metal bases are generally, but not exclusively, steel and can be contaminated with rust or oxidation, oil and grease. The surface should be thoroughly degreased and then abraded or wire brushed to remove the rust or oxidation. Any high spots may need to be ground off.

In most instances, but not where there is excessive vertical or lateral flexing or movement, a cementitious smoothing compound of at least 3mm thickness must then be applied prior to the installation of the vinyl floorcovering. The smoothing

underlayment supplier will provide details on which product within their range must be used to suit the end use application and subfloor construction, together with details of which primer should be used.

13.2 Painted or epoxy coated floors

Epoxy and polyurethane surface coatings should ideally be removed, in order to ensure that no breakdown of the sub-floor occurs after installation of the resilient floorcovering.

Painted floors will impair the adhesion of the resilient floorcovering and should be removed prior to the application of the floorcovering. Mechanical methods such as grinding or blasting are the most suitable methods for removing these coatings. However, where the paint proves difficult to remove, the floor may need to be scabbled. If the epoxy coating is well bonded to the subfloor, it is possible to apply the floorcovering after grinding or blasting. In both instances, the surface should then be made good with a 3mm minimum coating of a suitable cementitious smoothing underlayment, applied in accordance with the manufacturer's recommendations, which may include the application of a primer key coat.

13.3 Existing floorcoverings

Polyflor vinyl and rubber flooring should never be laid over existing floorcoverings and in such instances where this is carried out, Polyflor accepts no responsibility for non-performance of its products.

All existing floorcoverings must be uplifted and as much as possible of the old adhesive removed from the subfloor. Special care must be taken on very old floors, as some products - but not Polyflor - contained asbestos. In these instances, contact Polyflor for further information.

The removed floorcoverings should be deposited in skips and disposed of by controlled incineration, landfill or through a recognised reclamation scheme. They should never be incinerated on-site with other building waste.

A suitable 3mm thick floor smoothing underlayment should then be applied to the whole floor. Failure to remove sufficient adhesive can lead to premature failure of the underlayment.

After uplifting existing floorcoverings laid on plywood and hardboard, used as fabricated underlays, it is almost always necessary to replace the plywood or hardboard. After uplifting existing floorcoverings laid on suspended chipboard or plywood subfloors, 4mm thick plywood should be applied to the subfloor as described in Section 12.6.