

## IMPERVIOUS ACRYLIC



## Contents

<b>Introduction</b>	<b>2</b>	<b>How do I look after it?</b>	<b>5</b>
<b>Why Choose Impervious acrylic?</b>	<b>2</b>	<b>Resurfacing</b>	<b>8</b>
<b>What is it made of?</b>	<b>3</b>	<b>Lifecycle Costs &amp; Sinking Funds</b>	<b>9</b>
<b>How does it perform for the player?</b>	<b>4</b>	<b>Sinking Funds</b>	<b>11</b>

## Introduction

Impervious acrylic, sometimes referred to as “American Cement”, or in the US simply as “hard courts”, is widely used throughout the tennis-playing world. It is the surface on which many major championships are played, including the Australian and US Open Grand Slams and around half of the ATP and WTA Tours are played on indoor and outdoor acrylic surfaces.

The number of impervious acrylic courts built in Britain has been growing steadily since 1986, when the launch of the Indoor Tennis Initiative brought about an increase in the selection of impervious acrylic surfaces, both indoors and outdoors. A significant growth however occurred during the 1990s following the recognition of impervious acrylic as a preferred performance surface by the LTA.

The construction of an impervious acrylic court is, in principle, quite straightforward. The playing surface consists of multiple applications of coloured impervious acrylic materials installed on a sub-base, usually of dense macadam, which is laid on a suitable depth of well-compacted aggregate foundation. Other suitable foundations that may be used are, for example, a reinforced concrete slab. Most proprietary systems offer optional “cushioned” layers of varying depth, intended to provide a degree of player comfort. Being non-porous, an outdoor impervious acrylic court is constructed with a slight slope to help water to run off.

## Why choose Impervious Acrylic?

The overall combination of the surface’s playing characteristics makes it suitable for all standards of play, up to the highest levels of competition. The surface encourages and rewards good playing technique and so is also ideally suited for all levels of coaching and training.



The surface can be played on for twelve months of the year, depending on the weather conditions. The impervious nature of the surface *does* mean that on outdoor courts during periods of rainfall, surface water or puddles will form which will normally prevent play from continuing. Before play can recommence this must be cleared and can be achieved with the use of specific drying aids such as squeegees.

The decision to install an impervious acrylic court needs careful consideration, as the choice of an impervious surface has important implications:

The need to use drying aids to allow play to continue after rainfall is itself an important factor that may affect suitability.

### **The overall size of facilities and the provision of porous and/or indoor courts.**

The construction may seem simple but the correct design of the courts and the selection of an appropriate specification are essential if the necessary high standards of finished work are to be achieved.

Another very important issue that anyone choosing an impervious acrylic surface must consider is cushioning. Cushioning can be provided in the form of in-situ laid rubber layers or preformed shockpads. Compared to some other types of surface, the shock absorbency effect of most cushioned impervious acrylic courts is relatively small. If cushioning is laid, it should be applied to the whole of the court area, not just the area within the court markings. Whilst most impervious acrylic surface systems offer different amounts of built in “cushioning”, all but the most cushioned (and therefore most expensive) are still relatively hard compared to the cushioned effect of modern tennis shoes and socks. The shock absorbency properties of most thin layer cushioned systems are also temperature sensitive and may provide little improvement over non-cushioned courts for large parts of the year when laid outdoors.

There are now many more impervious acrylic surfaces available to choose from. Some are long established products that are used for tournament venues around the world, whilst others are less well known, but in all instances the choice of surface, specification and contractor are all vital considerations.

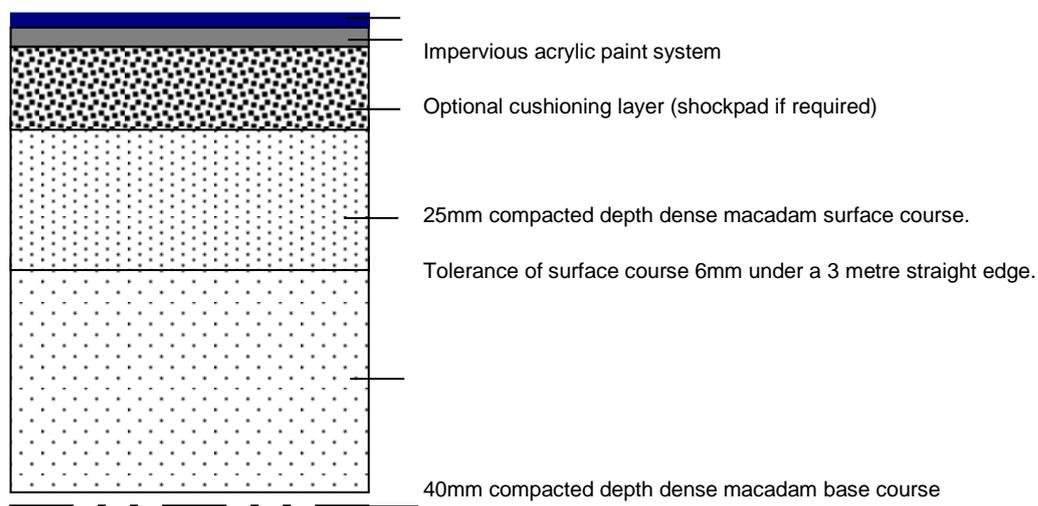
### **What is it made of?**

As described above, although other foundations may be practical, an impervious acrylic court typically comprises the proprietary surfacing system installed on a dense macadam sub-base. In order to achieve a satisfactory evenness of level on the final surface, it is normal to construct the dense macadam sub-base in two layers. Whilst certain deficiencies in the



finish of the dense macadam receiving layer can be overcome during the installation of the surfacing itself, the dense macadam must be sufficiently smooth, even and clean to be acceptable.

### Minimum Design Requirements:



Any court should be built with a sufficiently stable foundation to ensure the desired quality and longevity of the finished surface, and this is no less important for the installation of an impervious acrylic court. The precise specification must also properly reflect the nature and condition of the particular site. The essential difference in the construction of an impervious acrylic court is that a dense foundation is required, compared to one through which water must pass for surfaces such as macadam and synthetic grass.

The optimum run-off of surface water will depend on the construction of an adequate gradient on the court; the LTA recommends a cross-fall of 1:120, up to a maximum of 1:100. This is particularly important when converting a porous surface to impervious acrylic where the fall must be established above the existing court. A long-fall of 1:120 may be acceptable but prolongs the period required to remove surface water ponding after rainfall.

The provision of adequate drainage to collect water is equally important, particularly as significant quantities of rain may need to be dealt with. It is usual practice to install drainage channels within the edging along the low sides of courts, but the system must be carefully designed, particularly when blocks of two or more courts are to be built. Alternative designs will usually be possible, which will differ in their effectiveness, appearance and cost. Where drainage channels are positioned in side runs between courts, these may be considered to be trip hazards and each court should be dimensioned as a single tennis court, i.e. no common side run.

## How does it perform for the player?

The exact performance of surfaces may differ slightly from product to product, but impervious acrylic courts can generally be described as being medium-paced, with an extremely true ball bounce of medium height. As the means of assessing surface pace has been developed it has allowed manufacturers to offer a wider range of speeds. These typically range from medium slow to fast and it is now not uncommon for clients to specify what surface pace (SPR) they require.

<b>Playing Characteristics</b>	
<b>Ball-surface:</b>	
<b>Speed of court:</b>	Medium slow, medium, medium fast or fast
<b>Height of ball bounce:</b>	Medium
<b>Trueness of bounce:</b>	Uniform
<b>Ball spin:</b>	
<b>Topspin</b>	Yes
<b>Slice</b>	Yes
<b>Player-surface:</b>	
<b>Footing:</b>	Firm footing
<b>Traction</b>	Non-slip
<b>Shock Absorption:</b>	Hard to moderate depending on cushioning

The surface responds to shots hit with either topspin or slice, and provides secure foothold.

The consistency of performance helps players to develop well-grooved strokes, and better court-craft

Sound tactics are encouraged as good shots are rewarded.

The overall combination of surface characteristics encourages players of all standards to improve.

Whatever words are used to describe any court's qualities, there is no better way to form an opinion than by playing on the surface.

## How do I look after it?

The following maintenance procedures are designed to ensure that:

the playing surface is kept scrupulously clean, to preserve its playing characteristics

that the court looks attractive and well cared for at all times, and achieves a reasonable life span

These objectives are achieved by regularly:

- sweeping or vacuuming leaves and other detritus from the surface
- washing the court surface to keep it clean

## Keeping the Surface Clean

Leaves, pine needles, dust, dirt, rubbish and all detritus should be removed from the surface regularly using a wide broom, (medium to soft bristles; not too stiff or hard), or a garden vacuum cleaner. If the latter is used, it should be well maintained and carefully operated to avoid contamination or physical damage to the surface.

At least once a year, (more often if the courts are heavily used or are in a location subject to pollution by traffic fumes, aphid secretions, etc.) the surface should be thoroughly washed using a cold water pressure washer taking care not to damage the surface. Stains can be removed with a mild detergent.

## Maintenance Schedule

	Outdoor	Indoor
Daily - at the end of play	Make sure the gate is shut to prevent unauthorised use	
<u>Weekly</u>	Remove dust, leaves, rubbish and other detritus from the surface using a medium to soft brush	Vacuum to remove ball fluff and grit which if allowed to accumulate will act as an abrasive

<u>Monthly</u>	Wash the surface to remove stains using a mild detergent and soft brush	Wash the surface to remove stains using a mild detergent and wet vacuum. To ensure the courts do not become slippery they must be thoroughly dried after washing.
<u>Annually</u>	Power wash  Apply moss and algae killers  Remove debris from drainage channels.	Wash using rotary machine (caution: overuse of this machine will cause premature wear of the surface). To ensure courts do not become slippery they must be thoroughly dried after washing.
	Check the court surface carefully. Call in the installer if there is any cause for concern or you suspect the surface needs re-coating.	

**Note:** These are minimum recommendations. Common sense and careful observation should prevail. If any serious doubt exists about the effectiveness of the maintenance regime or the condition of the court(s), call in the installer immediately. It is better to be safe than sorry.

### Monitoring the Surface

Keeping the surface clean as described in the previous section is the only routine maintenance that the court surface should require. In the unlikely event of other apparent defects accruing e.g., cracks, crazing, etc., the installer should be consulted.

The surface should also be maintained to enable surface re-coating to be scheduled when required. A newly laid surface should give firm foothold and a good medium-paced game. As the surface is used over the years, however, it will become smoother and more polished. This may result in a somewhat faster game and, eventually, some impairment of the foothold when the surface is damp. When this happens it will be time for the surface to be re-coated. The re-coating requirement should be discussed with the installer when the new court is

handed over, and the condition of the surface maintained in the light of their recommendations.

## Resurfacing

The virtue of impervious acrylic courts is that if they are well-specified and well-built in the first place the top playing surface can be 'resurfaced' at a relatively low cost and have a very long life before major work is carried out. Resurfacing falls into two main categories depending on the structural condition:

If the court is in good structural condition but has become worn i.e. is losing colour and texture, it can be restored to 'as new' condition by suitable preparation (cleaning, power washing and surface abrading) and the application (by squeegee) of one or two coats of color-finish material. Depressions or surface imperfections must be treated prior to this re-coloring.

If the structural condition of the court has deteriorated significantly, it may become necessary to superimpose a new layer of dense bitumen macadam, or to remove the top 25mm or so of the existing macadam sub-base and replace it. A completely new impervious acrylic surface is then built up.

## Life Cycle Costs

Table 1 shows the total cumulative **budget** un-inflated over a life cycle of 12 years. It shows the initial construction cost and the subsequent maintenance, repair and renovation costs incurred during the court life cycle.

**Table 1.**

Year	New Court construction	Moss and algae kill	Power washing	Recoat impervious acrylic wearing surface	Replace fence and gates	Minor repairs
1	£30,000					
2		£150	£350			£100
3		£150	£350			
4		£150	£350			£100
5		£150	£350			
6				£5,500		£100
7		£150	£350			
8		£150	£350			£100
9		£150	£350			
10		£150	£350			£100
11		£150	£350			
12				£5,500	£3,800	£100
<b>Total Construction Cost</b>	<b>£30,000</b>					
<b>Total Running Costs</b>		<b>£1,350</b>	<b>£3,150</b>	<b>£11,000</b>	<b>£2,500</b>	<b>£600</b>

Notes:

Figures are based on the average cost of a new non-cushioned tennis court in a block of three. For more than one court costs should be calculated on a pro-rata basis.

Figures exclude VAT, inflation and overheads (e.g. fees)

Figures are subject to regional variation



## Sinking Funds?

A sinking fund is created by putting aside each year an amount in cash that will cover the full cost at the time of replacement of an asset such as a tennis court.

As the cost to you of this replacement is in the future, you will need to save the amount of money that you will spend at that future date, not the cost at today's date.

This means that it is not possible to take the cost of replacement at today's prices and divide it by the number of years until replacement is due. A more complex sum, but one which is standard practice is involved. This sum takes into account compound interest to the replacement date and can make the amount you need to save appear quite high.

The logic is that present membership fees should cover the deterioration of the courts caused by the present members so that the funds for replacement are automatically available when the courts have to be renewed.

### Sinking fund requirements

Table 2 shows the amount of money to be invested each year to cover the cost of re-coating an impervious acrylic court in year 6.

**Table 2.**

Year	1	2	3	4	5	6
Annual Contribution	£900	£900	£900	£900	£900	£900
Balance Brought Forward		£900	£1,845	£2,837	£3,879	£4,420
Interest @ 5%		£45	£92	£142	£194	£221
Expenditure						£5,541
<b>Accumulated Fund</b>	<b>£900</b>	<b>£1,845</b>	<b>£2,837</b>	<b>£3,879</b>	<b>£4,420</b>	<b>£0</b>

The combined rate of 5% for interest & inflation has been taken into account in these figures.

Routine maintenance costs are excluded

Budget costs (table 1 and 2) are exclusive of VAT