



i Choosing the Playing Surface

There are essentially two main groups of pitch surface: synthetic turf and natural grass. Within each, there are several different types. As these guidelines are aimed predominantly at synthetic turf pitches, only a brief statement regarding natural grass is included here.

Pitch owners considering hosting national or high level competition should consider carefully the choice of an approved turf product and level of pitch certification when planning the facility. In addition to consulting with England Hockey, they should seek advice from the FIH, the world governing body for hockey www.worldhockey.org.

The decision as to the type of playing surface to be installed has direct implications for the design of the drainage system, the need for irrigation, the nature of the base and sub-base and, in some cases, for the marking of lines.

Synthetic (or Artificial) Turf Pitches

There are a number of different types of synthetic surface available. These fall generally under one of the following headings:

Filled surface:

A turf surface (or carpet) of woven, tufted or knitted synthetic yarn fully supported or stabilised by the addition of filling material (e.g. sand and therefore sometimes referred to as sandfilled turf/pitch) to the full height of the pile to help maintain its verticality. The pile height is greatest in this type of surface.

The sand is an important element. A high quality material with well-rounded particles that allows adequate drainage at all times and prevents compaction of the fill while under use is usually specified by the pitch supplier.

Dressed surface or water-based filled surface:

A turf surface (or carpet) of woven, tufted or knitted synthetic yarn partly supported or stabilised by the addition of filling material (e.g. sand and therefore sometimes referred to as a sand-dressed turf/pitch) to between 65% and 80% of the pile height to help maintain its verticality. The pile is a little denser in this surface but the pile height is less.

For optimum performance, it is recommended that this type of surface be watered, although this is not absolutely necessary. The quantity of water should be much less than on an unfilled water-based surface – see below.

Unfilled surface (un-watered):

A turf surface (or carpet) of woven, tufted or knitted synthetic yarn only without support or stabilization by other materials. The pile height is less than for a dressed surface, but the pile itself is denser to provide stability to the turf surface. This type of pitch is rarely used for competitive hockey as its playing characteristics are inferior to other types.



Water-based unfilled surface:

A turf surface (or carpet) comprising a very dense woven, tufted or knitted synthetic pile of short length. It is essential from the safety, comfort and playability points of view that this type of surface is maintained wet during play. It also ensures that wear on the turf carpet is minimised and the full expected life of the turf realised.

Long-pile surface (also known as a “third generation”, “3G” or “rubber crumb” pitch):

A turf surface (or carpet) comprising a synthetic yarn, the pile of which is much longer than any of the previously mentioned types; it is also the least dense. The turf carpet is partially filled with small rubber granules to about 50% to 75% of the pile height although an initial bottom layer of sand is sometimes used. In general, this type of surface does not meet the performance requirements for hockey. However, certain particular turfs of this type have been assessed and found to meet minimal requirements. Please refer to England Hockey facilities frequently asked questions for further information. For England Hockey’s full ‘Long Pile Turf Pitch Policy’ please go to www.englishockey.co.uk/facilities

Natural Grass Pitches

There are many types of grass, and expert advice should be sought to help in the choice of grass that is most suitable for a particular climate and soil conditions. Similarly, advice on whether to seed the pitch or to lay sods should be sought. The latter is far more expensive, but has the advantage that it can be played on much sooner than a seeded area, which could require at least a year of careful maintenance to become sufficiently established to permit safe play without causing serious damage to the surface.

Pitch Carpet Materials (Yarns)

Historically, turf yarns have been made from nylon, polypropylene or polyethylene, or a combination of those. There are some differences in performance characteristics between them and these are discussed below. England Hockey and the FIH do not specify any one type of yarn; its technical requirements are purely performance based.

Nylon:

Originally, all synthetic turfs were made of nylon and some manufacturers have continued with this yarn. It has the capacity to absorb water up to 5% of its own weight, and so it is softer and has a lower drag resistance when thoroughly wet, which many players welcome. As it dries out, however, it becomes harder and adopts a higher drag coefficient so that playing conditions can change noticeably during the course of a single match, particularly on hot, drying days. The higher drag can lead to an increase in lower limb injuries.

Polypropylene:

All three yarn materials are treated during their manufacture to have resistance to ultra-violet (UV) light, which tends to make the fibres become brittle in time. None is completely UV-resistant, but polypropylene is probably the best of the three, followed by polyethylene. So for hot, sunny climates, this may be a consideration. Polypropylene fibres remain hard at all times, because they are impervious to water. Particularly when fibrillated, polypropylene has the capacity to hold water between the pile fibres (as does nylon) but as the water drains or evaporates, the drag coefficient

remains fairly constant. For both nylon and polypropylene surfaces, the amount and frequency of water application affects the playing characteristics of the pitch. The design of irrigation and drainage systems is therefore critical.

Polyethylene:

The majority of FIH approved manufacturers appears to be moving from polypropylene to polyethylene yarns because the latter have an improved slide factor, which in turn should require the application of less water. Early reports from players and officials with experience of this new material (frequently referred to as LSR – low slide reaction) indicate that substantial savings in water quantity for irrigation can be realised without any consequential adverse effects on pitch playability or player comfort and safety.

The FIH has stated that it is actively seeking a turf that requires no irrigation, yet exhibits the same qualities and characteristics as a water-based pitch as far as performance, playability and player comfort and safety are concerned. In this context, the initial reports on polyethylene surfaces are very encouraging. When this improved type of turf becomes available and accepted, this information will be updated.

Carpet Manufacture

Turf carpet manufacturers each have their preferred materials and methods of manufacture. They will use terms that may not be encountered elsewhere. Do not be put off by the technical language. Talk to clubs and associations with recent experience and learn from that experience.

England Hockey and the FIH make no recommendation with regard to the various treatments to the yarn or the processes to form the turf carpet. For example, the yarn may be twisted, curled, fibrillated, multiplied or have other treatments before it is looped or knitted into a pre-formed backing fabric and then cut to the desired length. The backing fabric is then sealed.

Manufacture is by weaving, tufting or knitting to the density required for the particular type of surface.

Shock-pads

Early synthetic turfs were laid without a shock-pad or elastic layer (e-layer). It is now recommended that all synthetic pitches be laid with one of the many forms of shock-pad as it will help to absorb the impact (dynamic forces) of players running on the surface and reduce the incidence of lower limb injuries. In fact, the FIH now makes a shock-pad mandatory for any pitch to become classified under its listing. The various forms of shock-pad include the following.

- **Integral pad:** the manufacturer bonds the shock-pad to the back of the turf carpet at the factory. A disadvantage of this system is that the resulting carpet roll is very heavy and unwieldy to handle. Also the shock-pad should last much longer than the playing surface (carpet), yet, when the turf carpet has to be replaced, the shock-pad is lost and has to be replaced as well.
- **Roll-out pad:** this pad is manufactured separately and supplied in rolls. It is then fixed in place by gluing and/or stitching.



- **Modular pad:** this pad is manufactured separately, but supplied in rectangular modules for fixing using an adhesive.
- **Dimple pad:** this is a roll-out pad, but one that has been formed into large dimples to allow a degree of air-cushioning.
- **In-situ pad:** as the name suggests, this is manufactured on site using a hot mix of rubber shred or crumbs, bound with polyurethane. It is laid using a highway paving machine. The advantage of this system is that the pad can be of variable thickness to even out any imperfections in the level of the underlying base, and can produce a smooth finish on which to lay the turf carpet.

Pitch Construction

The FIH 'Handbook of Performance Requirements for Synthetic Hockey Pitches – Outdoor' (A copy of which is available from the FIH website: www.worldhockey.org) describes the necessary construction for a pitch and the various tests that need to be performed and passed for a pitch to be certified as complying with the requirements.

It is recommended that the pitch surface and shock-pad be laid on a properly designed and engineered base and, where necessary, a sub-base. The base should comprise a layer of graded stone (which includes the drainage system) overlain by a layer (preferably two layers) of a bituminous material. Carried out properly, the base will outlast by several times the life of the shock-pad and surface carpet.

Approved Turfs

A list of turfs meeting the requirements in the FIH handbook mentioned above is published on the FIH website (www.worldhockey.org).

NOTE: Information adapted from the FIH Guide to installing Hockey pitches and facilities