



# IRRIGATION

## WHY IRRIGATE?

During dry summer periods water losses from the soil can be as high as 3.5 mm a day through evapotranspiration. When there is no rainfall to compensate for this, and the soil moisture reserves become depleted resulting in drought-stressed turf and a decline in surface quality/uniformity. In extreme cases, grass can be lost (see image opposite). In prolonged dry periods, the application of irrigation water by artificial means is required to maintain turf uniformity as well as ensuring the turf can withstand and recover from wear damage.



Climatologists are predicting our summers may become 15-35% drier, which will increase the demand on our irrigation systems, but also on the actual supply of water to them. As water demand will be greater and costs are likely to increase it is most prudent to ensure the application of irrigation is minimised by adopting sensible greenkeeping practices, in addition to ensuring the water that is applied reaches the target area, i.e. the roots.

## IRRIGATION PRINCIPLES

- Good agronomic practices will reduce the need for irrigation application.
- Water should never be over applied.
- Apply water only to keep grass alive and the surface uniform, never to keep the surfaces green, or make them receptive.

## MINIMISING IRRIGATION

The adaptation of sound aeration, fertiliser and top dressing programmes will increase the natural tolerance of the turf to drought and minimise the need for irrigation. Over-watering, will lead to shallow-rooted turf which increases the need for more regular application of water. A classic 'vicious circle'. This management will promote the growth of annual meadow-grass (*Poa annua*), resulting in all the problems associated with this species.

## WHEN TO IRRIGATE

Watering during the heat of the day will lead to greater evaporation losses. The best time to water is during the late evening or overnight. Watering at this time means play is not interfered with and the soil has had time to dry out slightly before play commences. In periods of intense heat, occasional and extremely light irrigation during the day may be called for to help cool down the turf. This operation, often referred to as 'syringing', is currently rare in Scotland but may become more common given the prediction of warmer, drier summers.



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## HOW MUCH TO APPLY

Maintaining soil moisture levels somewhere between field capacity (constant saturation) and the permanent wilting point (drought stress) should be the aim.

The ability to correctly calculate the irrigation input is necessary to maintain a quality sward and conserve water. The amount of water given at any one application should retain moisture in the top 150 mm or so of the soil profile. This may need applications on a daily basis or at two to three day intervals (longer intervals in less droughty conditions), allowing a period between for the surface 50-75 mm to dry out slightly and let in air.

It is very important when irrigating to ensure the rate of water application should not exceed the infiltration rate of the turf. If it does, run-off occurs which wastes an increasingly valuable resource and needlessly increases maintenance costs. Thatch management, regular aeration and sensible use of wetting agents ensure the rapid and uniform infiltration of water into the turf.

## WATER SOURCES

As mains water becomes more expensive, more sustainable and less expensive sources of water for irrigation are required. This may involve obtaining water from:-

- Underground aquifer.
- Streams and rivers
- Recycled water, i.e. waste water from the clubhouse
- Harvested rainfall
- Drainage systems

Water from underground aquifers and rivers/ streams is cheaper than mains water, but such sources do not provide a finite supply. Abstraction of such water is regulated through SEPA's Controlled Activities Regulations : <http://www.sepa.org.uk/regulations/water/abstractions/> and a licence fee and data reporting may be required.

The most sustainable source of water for irrigation is recycled water from rainfall and drainage systems. Ideally, the water from such sources should be harvested and stored on the course in lagoons or ponds for subsequent use in the summer.

Linking any course drainage systems into new or existing water stores will further enhance the efficiency and sustainability of these systems. With wetter, milder autumns and winters and hotter, drier summers predicted, this approach will have to be considered by those having the land to accommodate such a storage facility.



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## WATER QUALITY

Before any water is used, especially from aquifers or recycled sources, it is vital to test its quality in a laboratory. This should cover:

- pH,
- Alkalinity
- Salinity.
- Industrial/agricultural pollution.

If water quality of the course is an issue, corrective measures are possible, e.g. action can be taken to reduce alkalinity by the installation of acid injection systems.

## IRRIGATION SYSTEMS

Many clubs now have automatic irrigation systems on greens and tees (some have them on fairways) which provide an efficient means of water application. A well-designed irrigation system can help to conserve water by allowing the user to put this precious resource where it is most needed, but it is vital such systems are **not** over, or misused.

Complementing these systems with localised hand watering to high areas or severe slopes is often required and very desirable to ensure a uniform surface is produced.

Finally, ensure such systems are serviced and maintained regularly to ensure performance is optimised.



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