

USGA

Rebuilding Greens - The Gravel and Intermediate Sand Layer

By Pat Gross

Probably the most notable changes in the 1993 USGA Green Construction Recommendations were:

1. Including criteria that allowed for the exclusion of the intermediate sand layer, and
2. New recommendations for particle size and installation of the gravel blanket.

First, let's talk about the intermediate sand layer. The installation of the intermediate sand layer, choker layer, blinding layer - whatever you want to call it, was a big sticking point for many people. Eliminating this layer was the most common short cut to building greens because it saved time and money. This led to many people eliminating the choker layer then calling their construction method "modified USGA Greens."

Architects, builders, superintendents and even the USGA Green Section realized for several years that some courses were able to

build successful greens without an intermediate layer. But, there were many more failures than success stories as a result of this short cut. Since people were more likely to continue excluding the intermediate sand layer despite what the specifications said, the USGA asked Dr. Norm Hummel to research the subject and outline the conditions where the intermediate layer is not necessary. These guidelines were developed from existing specifications used by civil engineers for layered drainage systems. Briefly, the intermediate sand layer can be eliminated if the largest 15% of the root zone particles bridge with the smallest 15% of the gravel particles and a specific permeability ratio is maintained (i.e. the D15 of the gravel is greater than or equal to 5 times the D15 of the root zone). I know, it sounds like Greek to me too. The bottom line - **have both materials checked by a physical soils testing laboratory to see if**

the intermediate sand layer is necessary.

With the publication of the 1993 USGA Recommendations, many people incorrectly assumed that the intermediate sand layer was no longer necessary. Wrong! The intermediate layer can only be eliminated if strict gravel specifications are met. If this can't be accomplished, you will need an intermediate sand layer to prevent particle migration into the gravel. If needed, the intermediate material must have at least 90% of the particles between 1mm and 4mm, and the material must be placed by hand at a uniform depth of 2" to 4".

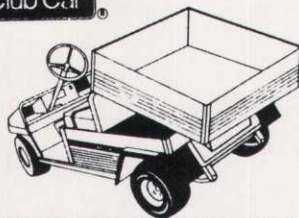
This brings us to the next subject - gravel selection. How do you go about finding a gravel that allows you to eliminate the intermediate sand layer, and is it worth the effort? In most cases, finding the right gravel to eliminate the need for the intermediate layer is worth the effort and will save time and money for the overall project. You

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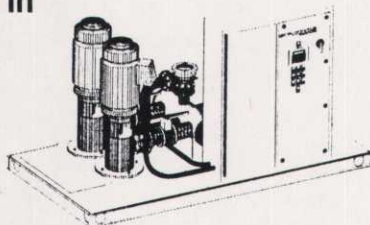
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