



Highlights of Recent Changes to the USGA's Green Construction Recommendations

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The USGA's recommended method for putting green construction has been revised three times during the last 30 years. Each revision was an effort to integrate the current level of scientific knowledge with the sound practical experience of the Green Section staff. The underlying intent of the USGA has always been to provide a method for greens construction with the highest potential for success under a wide range of environmental conditions.

During 1991, Dr. Norm Hummell, associate professor at Cornell University, spent his year on sabbatical leave working with the USGA to update and standardize the laboratory procedures used by various labs that test the construction materials used to build putting greens. After an extensive review of the scientific literature pertaining to the use of high-sand content root zone mixtures for turf a number of revisions to the USGA specs were recommended.

An Advisory Committee of soil scientists and Green Section Staff was assembled to review the recommendations. After review, the proposed revisions were submitted to an international

group of approximately 30 soil scientists, lab personnel, architects, and industry personnel for comment and further suggestions. The USGA has utilized a broad base of scientific knowledge and practical experience to achieve several goals regarding the current revisions:

- 1) To increase confidence in the specs by standardizing lab procedures.
- 2) To reduce the cost of building greens to USGA specs by removing unnecessary steps during constructions and to provide more flexibility in choosing construct materials.
- 3) To utilize the most current level of scientific knowledge to develop a comprehensive set of recommendations.
- 4) To identify areas in our knowledge of greens construction methods that are poorly understood and will require further research efforts in the future.

The following is a summary of the major changes:

SUBGRADE

The subgrade can be shaped to facilitate drainage and need not conform exactly to the proposed surface

contours. However, the contours of the gravel layer must closely conform to the finished grade.

A geotextile fabric may be used between the gravel layer and an unstable subgrade soil, i.e. muck, expanding clay, etc.

DRAINAGE

Drainage trenches shall be a minimum of 8 inches (20 cm) deep.

Drain lines shall be installed no more than 15 feet (5 m) apart.

The main line shall be extended for a short distance from the back/high side of the green to facilitate the installation of a clean-out port.

A perimeter (smile) drain shall be installed along the low edge of the green/surrounding-soil interface and shall extend to the first set of laterals.

GRAVEL

Angular particles are preferred for stability—to facilitate shaping; pea gravel is, of course, acceptable.

Gravel of questionable weathering/mechanical stability must pass the LA Abrasion test and/or the sulfate soundness test—ASTM tests C-131 and C-88, respectively.

PARTICLE SIZE DISTRIBUTION OF A USGA ROOT ZONE MIX

| FINE GRAVEL | VERY COARSE SAND | COURSE SAND | MEDIUM SAND | FINE SAND | VERY FINE SAND | SILT | CLAY |
|---------------------------------|------------------|---|--------------------|-------------------------------|--------------------|---------------------|--------------------|
| 3.4 mm to 2.0 mm | 2.0 mm to 1.0 mm | 1.0 mm to 0.5 mm | 0.50 mm to 0.25 mm | 0.25 mm to 0.15 mm | 0.15 mm to 0.05 mm | 0.05 mm to 0.002 mm | LESS THAN 0.002 mm |
| MAX 3% | | AT LEAST 60% OF THE PARTICLES MUST BE WITHIN THIS RANGE | | MAX 20% | MAX 5% | MAX 5% | MAX 3% |
| 10% MAXIMUM GREATER THAN 1.0 mm | | | | 10% MAXIMUM LESS THAN 0.15 mm | | | |

The need for an intermediate sand layer can only be determined by a soil laboratory and depends upon the relationship between the particle size distributions of the gravel and the root zone mix.

Where an intermediate sand layer is required—no more than 10% of the gravel can be retained on a 1/2 inch sieve, at least 65% must pass through a 3/8 inch sieve and be retained on a 1/4 inch sieve, and no more than 10% can pass through a 2mm sieve.

INTERMEDIATE SAND LAYER

The acceptable particle size has been expanded from 90% of the particles between 2mm and 1mm, to 90% between 4mm and 1mm.

ROOT ZONE MIXTURE

The acceptable particle size distribution of the USGA root zone mix is summarized in the accompanying table.

Allowance has been made for more fine sand (0.25mm-0.15mm) but less very fine sand (0.15mm-0.05mm).

The peat source must be a minimum of 85% organic matter by weight. Other organic composts should be aged for at least one year and must be proven to be non-phytotoxic to the turf by the supplier. The final organic matter content of the mix must be between 1-5% by weight (ideally 2-4%).

If soil is used in the mix it must have a minimum sand content of 60% and a clay content between 5% and 20%. The final mix must still conform to the revised guidelines for particle size distribution.

Several root zone physical properties have been modified:

Total porosity: 35-55%
(previously 35-50%)
Air-filled porosity: 20-30%
(previously 15-25%)


Saturated Conductivity (percolation rate)
Normal range: 6-12 in/hr (15/30 cm/hr)
Accelerated range: 12-24 in/hr (30-60 cm/hr)

SOIL FUMIGATION

Sterilization required prior to establishment of turf only 1) in areas prone to severe nematode problems, 2) in areas prone to grassy weed or nutsedge problems, or 3) when the root zone contains unsterilized soil—otherwise optional.

The complete recommendations will be available during January 1993. For a copy, call 414-241-8742. Or write:

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Mequon, Wisconsin 53092



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1993 Commercial Applicator Training Sessions

Roger Flashinski, pest management education specialist for the UW Extension, has announced pesticide applicator training sessions for this year.

Training is designed for initial certification or recertification. Sessions begin at 8:30 a.m. and conclude at about 2:30 p.m. Afterwards, 90 minutes are allowed for the exam.

The dates and locations for Ornamental and Turf (3) training are:

| Location | Date | Pre-Registration Deadline |
|------------|----------|---------------------------|
| Milwaukee | March 19 | March 5 |
| Arlington | March 24 | March 10 |
| Milwaukee | March 31 | March 17 |
| Green Bay | April 2 | March 19 |
| Eau Claire | April 7 | March 24 |
| Milwaukee | April 14 | March 31 |

For those who need Aquatic pest-control training (5), a session will be held in Wausau on March 15. Pre-registration deadline is March 1.

To register for a training session and to receive your training materials, please complete a "Commercial Pesticide Applicator Training" registration card. These cards are available from your county Extension office or from the Pesticide Applicator Training office in Madison. Indicate the location and date of the training session you desire to attend and the pest control category in which

training materials are being requested. Return the registration card and training fee to:

Pesticide Applicator Training -Department of Agronomy
1575 Linden Drive
Madison, WI 53706-1597

Please register before the deadline date listed for each training session. Advance registration allows ample time for you to receive and review your training materials prior to the scheduled session, and it may avert cancelling a training session due to inadequate enrollment. We will notify you regarding the status of your session approximately 7 to 10 days prior to the scheduled date. Directions to the meeting facility will be given at that time.

To become certified in commercial pest control categories not listed here, review the appropriate training manual and study guide and then make exam arrangements directly with the Wisconsin Department of Agriculture, Trade and Consumer Protection. Their phone number is 608-267-9652.

If you desire more information on registration and obtaining training materials, or if you're unsure which pest control category certification is needed, please call either:

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| Rose Scott Program Assistant 608-262-7588 | Roger Flashinski Pest Mgmt. Education Specialist 608-263-6358 |
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