

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 construction and to provide more flexibility in choosing construction 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.

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 ½-inch sieve, at least 65% must pass through a ⅜-inch and be retained on a ¼-inch sieve, and no more than 10% can pass through a 2-mm sieve.

PARTICLE SIZE DISTRIBUTION OF A USGA ROOT ZONE MIX

FINE GRAVEL	VERY COARSE SAND	COARSE 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%		MAX 20%	MAX 5%	MAX 5%	MAX 3%
10% MAXIMUM GREATER THAN 1.0 mm		OF THE PARTICLES MUST BE WITHIN THIS RANGE		10% MAXIMUM LESS THAN 0.15 mm			

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

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 (0.25 mm - 0.15 mm) but less very fine sand (0.15 mm - 0.05 mm).

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

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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: 6-11 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 became available in January 1993. For a copy, contact the USGA Green Section, Great Lakes Region, 11431 N. Port Washington, Rd., Suite 203, Mequon, Wisconsin, 53092, or call 414-241-8742.

Superintendents' 'Bull' Session To Be Held March 23 in Alexandria

A group of Central Minnesota Superintendents is getting together on Tuesday, March 23, 1993, at the Alexandria Golf Club at 10:00 a.m. to discuss course maintenance topics. Round table discussions of any topic will be fielded. Should you be able to attend, please call Steve Hamelau at 612-762-2004. All superintendents in the tri-state region are welcomed. Our past couple of meetings have lasted about five hours, with several people in and out between this time.

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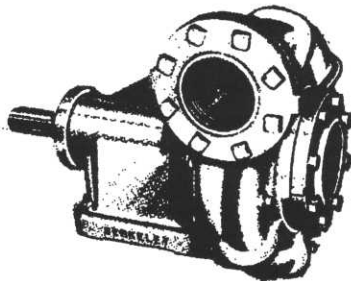
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- BEAN Rotomist, PTO driven, good condition, \$500 or best offer.

Contact:

Rochester Golf & Country Club
JAMES GARDNER
507-281-3241

S & R Program—

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for the first four months of the program.

"We believe that 'participatory' programs will become an important part of the funding for the GCSAA S&R foundation," said GCSAA President William R. Roberts, CGCS. "We're encouraging companies to think creatively and find ways to reinvest in the golf course industry."

In addition to partnership programs, GCSAA S&R also receives unrestricted support from a number of leading turf industry companies through its Platinum Tee Club. The Platinum Tee Club is composed of organizations that annually donate \$5,000 or more to GCSAA S&R. Besides companies previously listed, other corporate Platinum Tee members include American Golf Corp., DowElanco Products Co., E-Z-GO Division of Textron, Inc., Jacobsen Division of Textron, Inc., Monsanto Agriculture Group, Rhone-Poulenc Ag Co., Scott's Pro-Turf Division and The Toro Co.

Corporate support also comes through GCSAA's Golden Tee Club, composed of organizations that annually donate between \$1,000 and \$5,000 to GCSAA S&R. Corporate members of the Golden Tee Club currently include Hunter Industries and National Mower Co.

GCSAA S&R is a 36-year-old foundation dedicated to providing educational and scientific advancement for the golf course industry.