

## **Selection of bunker sands**

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Bunkers are hazards in the game of golf, but as golf course superintendents you strive for them to be fair, consistent, compliment the golf course, and be easy to maintain. Beyond the design of the sand bunkers, the selection of the sand to fill the bunkers is the most important consideration that needs to be made. The correct selection makes the job of the grounds-crew much easier; selecting the wrong sand is miserable for the grounds-crew and players alike.

There are seven properties, or qualities, of sand that need to be considered when selecting for the golf course. The properties include mineralogy, particle-size, particle shape, chemical reaction and hardness, infiltration rate (hydraulic conductivity), color, and thickness.

**Mineralogy.** A material consisting mainly of quartz is desired. Quartz is a very hard mineral and withstands mechanical breakdown that softer minerals are prone to. Many native sands contain calcite (limestone) that can breakdown, solublize, and cause crusting problems.

**Particle-size.** The largest majority of the particles should be between 0.25 and 1.00 mm in size. Smaller than this can cause problems with drainage and can easily be blown from bunkers when they are dry and unprotected. Particles larger than 1.00 mm in size cause problems around putting greens by dulling mowers quickly and causing water movement problems associated with layering of coarser and finer layers. The distribution, or the amount of the different sizes of sand, is also very important. Uniform sands tend to be unstable and those with many different sizes (wide distribution) much more stable.

**Particle shape.** Two components of particle shape are generally measured and considered. They are **angularity** and **sphericity** of the particles. The more angular and the less round (spheroid) the sand particles, the more stable a surface will be produced.

**Chemical reaction and hardness.** Sands with calcite (limestone) produce a high pH, dissolve, degrade, and can cause crusting problems.

**Infiltration rate (Hydraulic conductivity).** It is recommended the saturated hydraulic conductivity of the sand should be greater than 20 inches per hour. This is to facilitate drainage of the bunkers during and after rainfall events.

**Color.** The color of sands can vary from white to brown to black. It is no more than a preference as long as the color does not affect the performance of the sand.

**Depth.** For the bunkers to perform consistently, those constructing and maintaining them must maintain a consistent depth of sand. Deeper sands are drier than and not as firm as thinner sands.

Because of the generous contributions of Bruce Matthews who designed the bunkers, Tim Chataway who built the bunkers, Tim Osburn of Osburn Trucking, and Jim Surge of TriTurf Soils that donated sands, there are three sand bunkers that you can test at the Hancock Turfgrass Research Center. I hope you brought your sand wedge.