Infield Soil Mixes - Just How Much Sand Do I Need?

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The first question, every time, when amending infield soils is: How much sand do I need to add? Most often educated guesses are made and perhaps a truckload or two may be spread evenly over the skinned area and tilled in. While this trial and error method may work to some degree, one never knows what you are going to end up with.

While our method may still fall into the trial and error way of doing things, the initial steps in our recommendations can give you a better chance of calculating how much sand is needed.

The first step to amend infield soils with sand is to pull a sample of soil for a Particle Size Analysis (PSA). Knowing your sample depth and the results of the PSA, you can begin to calculate a good estimate for the amount of sand required to achieve a 50 or 60 percent level of sand in your infield skinned area. You will also need to decide the tillage depth of these amendments, which should equal the sampling depth for the PSA.

Calculations to achieve 50 percent sand

We will work through a sample calculation for a PSA containing:

- 32.5% Sand
- 42.5% Silt
- 25% Clay

Assumption: four inch sample depth; four inch tillage depth.

Start by taking:

- Four inch sample depth times percent of sand (0.325) = 1.3 inches of sand in the 4 inch profile equals 32.5% sand.
- To achieve 50 percent sand content, two inches of sand is required for the four inch profile. Difference is 0.7 inches of additional sand required (two inches needed minus 1.3 inches existing).

- Adding 0.7 inches of sand to the surface, then tilling 4 inches, we would be tilling only 3.3 inches of existing soil containing 32.5 % sand.
- Existing sand equals 3.3 inches times 0.325 = 1.07 inches of sand plus the 0.7 inches added = 1.77 inches of sand in the four inch profile.
- 1.77 divided by four = 44% sand. Not enough!

Try adding 0.8 inches of sand:

- Adding 0.8 inches of sand to the surface, then tilling four inches, we would be tilling only 3.2 inches of existing soil containing 32.5 % sand.
- Existing sand equals 3.2 inches times 0.325 = 1.04 inches of sand plus the 0.8 inches added = 1.84 inches of sand in the four inch profile.
- 1.84 divided by four = 46% sand. Still not enough!

Try adding 0.9 inches of sand:

- Adding 0.9 inches of sand to the surface, then tilling 4 inches, we would be tilling only 3.1 inches of existing soil containing 32.5 % sand.
- Existing sand equals 3.1 inches times 0.325 = 1.01 inches of sand plus the 0.9 inches added = 1.91 inches of sand in the four inch profile.
- 1.91 divided by four = 48% sand. Still not enough, but getting closer!

Try adding 1.0 inches of sand:

- Adding 1.0 inches of sand to the surface, then tilling four inches, we would be tilling only 3.0 inches of existing soil containing 32.5 % sand.
- Existing sand equals 3.0 inches times 0.325 = 0.98 inches of sand plus the 1.0 inches added = 1.98 inches of sand in the 4 inch profile.
- 1.98 divided by 4 = 49.5% sand. We are very close, but lets do one more! Here we have 0.98 inches of existing sand plus the need for one inch of new sand. In this example, we can add one inch of sharp sand, till four inches to achieve 50 percent sand content that is half round and half sharp sand.

Try adding 1.1 inches of sand:

- Adding 1.1 inches of sand to the surface, then tilling 4 inches, we would be tilling only 2.9 inches of existing soil containing 32.5 % sand.

- Existing sand equals 2.9 inches times 0.325 = 0.94 inches of sand plus the 1.1 inches added = 2.04 inches of sand in the 4 inch profile.
- 2.04 divided by 4 = 51% sand. We are there, but the previous calculation was close enough!

With only 50 percent sand, we would recommend 10 percent calcined clay be blended in. So how do we do that?

Once the sand content is at the recommended level and tilled to 4 inches, the amount of calcined clay is calculated in a similar way.

Start by taking:

- Four inch depth times percent of calcined clay wanted (0.10) = 0.4 inches of calcined clay in the four inch profile.
- Add 0.4 inches of calcined clay to surface and till to a four inch depth.

Calculations to achieve 60 percent sand

Start by taking:

- Four inch sample depth times percent of sand (0.325) = 1.3 inches of sand in the 4 inch profile equals 32.5% sand.
- To achieve 60 percent sand content, 2.4 inches of sand is required for the 4-inch profile. Difference is 1.1 inches of additional sand required.
- Adding 1.2 inches of sand to the surface, then tilling 4 inches, we would be tilling only 2.8 inches of existing soil containing 32.5 % sand.
- Existing sand equals 2.8 inches times 0.325 = 0.91 inches of sand plus the 1.2 inches added = 2.11 inches of sand in the four inch profile.
- 2.11 divided by four = 53% sand. Not enough!

Try adding 1.4 inches of sand:

- Adding 1.4 inches of sand to the surface, then tilling 4 inches, we would be tilling only 2.6 inches of existing soil containing 32.5 % sand.

- Existing sand equals 2.6 inches times 0.325 = 0.85 inches of sand plus the 1.4 inches added = 2.25 inches of sand in the 4 inch profile.
- 2.25 divided by four = 56% sand. Still not enough!

Try adding 1.6 inches of sand:

- Adding 1.6 inches of sand to the surface, then tilling four inches, we would be tilling only 2.4 inches of existing soil containing 32.5 % sand.
- Existing sand equals 2.4 inches times 0.325 = 0.78 inches of sand plus the 1.6 inches added = 2.38 inches of sand in the four inch profile.
- 2.38 divided by four = 59.5% sand. Close enough!

If our 0.78 inches of existing sand is round sand, then how much of the 1.6 inches of additional sand needs to be sharp sand and round sand?

Total sand required in the four inch profile is 2.38 inches to achieve 59.5 percent. Divide 2.38 inches by two to equal 1.19 inches of each (sharp and round sand). We need 1.19 inches of sharp sand. The existing soil has 0.78 inches of round sand, therefore an additional 0.41 inches of round sand is needed.

How much sand do I order?

Baseball Infield Square Footage:

90' bases, 95-foot arc
Skinned infield = 18,300 square feet
Grassed infield = 11,550 square feet

First example:

You need one inch of sharp sand. Take one divided by 12 to convert one inch to feet. That equals 0.08333 feet. Multiply that by the total square footage (grassed infield), 11,550 sqft, to equal 962.5 cubic feet. Divide cubic feet by 27 to equal cubic yards. That equals 35.65 cubic yards. To convert to tons, multiply by 1.35 for dry sand. So, 35.65 cubic yards times 1.35 tons/cubic yard equals 48.12 tons of sharp sand required to cover 11,550 square feet with one inch of sharp sand.

Second example:

You need 1.19 inches of sharp sand and 0.41 inches of round sand. Take 1.19 divided by 12 to convert 1.19 inches to feet. That equals 0.099167 feet. Multiply that by the total square footage (grassed infield), 11,550 sqft, to equal 1,145.38 cubic feet. Divide cubic feet by 27 to equal cubic yards. That equals 42.42 cubic yards. To convert to tons, multiply by 1.35 for dry sand. So, 42.42 cubic yards times 1.35 tons/cubic yard equals 57.27 tons of sharp sand required to cover 11,550 square feet with 1.19 inches of sharp sand.

Also:

Take 0.41 divided by 12 to convert 0.41 inches to feet. That equals 0.034167 feet. Multiply that by the total square footage (grassed infield), 11,550 sqft, to equal 394.62 cubic feet. Divide cubic feet by 27 to equal cubic yards. That equals 14.61 cubic yards. To convert to tons, multiply by 1.35 for dry sand. So, 14.61 cubic yards times 1.35 tons/cubic yard equals 19.73 tons of round sand required to cover 11,550 square feet with 0.41 inches of round sand.

Final Steps:

Tillage may be needed until soil is very loose without clay clods. Sand should be blended into existing soil as evenly as possible. Finish tilling, then moisten and roll the surface. Level surface with some type of leveling drag, moisten and roll again.

Additional calcined clays can be topdressed into the surface on the infield with a light nail drag. Keep infield moist and roll to desired playing surface.