



Custom Golf Materials, Inc.

P.O. Box 8, Old Bethpage, NY 11804

Phone: (631) 249-7471 • Fax: (631) 249-9036

ESTIMATIONS

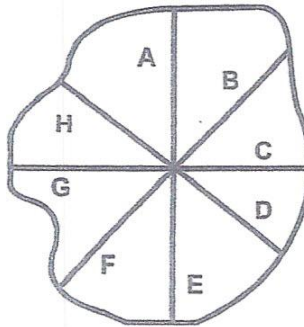
ESTIMATING AN AREA BY ITS AVERAGE RADIUS

The area of shapes that are similar to a circle but not perfectly round can be estimated by taking several measurements from the approximate center of the shape, computing the mean of the measurements, and using that mean as the radius. The more measurements taken, the more accurate the estimate is. Measurements every 10° around the center will yield 36 observations, and a very reliable estimate. This can be accomplished by using a steel tape and a 3' X 3' board with straight lines radiating from the center every 10 degrees.

NOTE: For purposes of illustration, only a few measurements are used in this example. This would not be enough measurements to give a very reliable estimate.

Example: Estimate the area of the golf green below.

A = 45'
B = 43'
C = 39'
D = 44'
E = 49'
F = 52'
G = 47'
H = 41'



Sum of the radii = 360

Mean radius = 45'

Area = $\pi r^2 = 3.14 \times 2025 = 6,358.5$ square feet

ESTIMATING TONS OF MATERIALS TO COVER A GIVEN AREA

For these examples, it is assumed that 1 cubic yard of sand, choker sand, or pea gravel weighs approximately 2,600 lbs., or 1.3 tons.

General formula for sand, gravel and greensmix is:

- A. Area in square feet x desired depth in feet = cubic feet
- B. Cubic feet ÷ 27 = cubic yards
- C. Cubic yards x 1.3 = tons
- D. Tons x (100 + percentage needed for waste) = tons required

For specific examples, see following sections.

12" greensmix layer: tons of mix required for a given area of green

1. A. Area of green in square feet x 1 foot = cubic feet of mix
- B. Cubic feet of mix ÷ 27 = cubic yards of mix
- C. Cubic yards of mix x 1.3 = tons of mix

An extra 10-20% is usually added to the totals to allow for waste in handling and compaction of mix. For this illustration, an added 15% is used.

- D. Tons of mix x 1.15 = tons of mix required



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Example: Calculate the amount of mix required for a 12" layer on a 5,000 square foot green

- A. $5,000 \text{ sq ft} \times 1" = 5,000 \text{ cu ft}$
- B. $5,000 \text{ cu ft} \div 27 = 185 \text{ cu yds}$
- C. $185 \text{ cu yds} \times 1.3 = 240 \text{ tons}$
- D. $240 \text{ tons} \times \text{US} = 276 \text{ tons of mix required for a 12" layer}$

2. Simplified formula for calculating tons of 12" greensmix layer, with fairly accurate results:

Square feet of green $\div 18 =$ tons required

Example: Calculate the amount of mix required for a 12" layer on a 5,000 square foot green.

$5,000 \text{ sq ft} \div 18 = 278 \text{ tons of mix required for a 12" layer}$

2" sand layer: tons of sand to cover a given area

1.
 - A. Area to cover, in square feet $\times .167$ feet = cubic feet of sand
 - B. Cubic feet of sand $\div 27 =$ cubic yards of sand
 - C. Cubic yards of sand $\times 1.3 =$ tons of sand

An extra 10-20% is usually added to the totals to allow for waste in handling and compaction of sand. For this illustration, an added 15% is used.

D. Tons of sand $\times 1.15 =$ tons of sand required

Example: Calculate the amount of choker sand required for a 2" layer on a 5,000 square foot green.

- A. $5,000 \text{ sq ft} \times .167' = 835 \text{ cu ft}$
- B. $835 \text{ cu ft} \div 27 = 31 \text{ cu yds}$
- C. $31 \text{ cu yds} \times 1.3 = 40 \text{ tons}$
- D. $40 \text{ tons} \times 1.15 = 46 \text{ tons of choker sand required for a 2" layer}$

2. Simplified formula for calculating tons of 2" sand layer, with fairly accurate results:
Square feet of area to cover $\div 108 =$ tons required

Example: Calculate the amount of choker sand needed for a 2" layer on a 5,000 square foot green.

$5,000 \div 108 = 46 \text{ tons of choker sand required for a 2" layer}$

4" sand layer: tons of sand to cover a given area

1.
 - A. Area to cover, in square feet $\times .33$ feet = cubic feet of sand
 - B. Cubic feet of sand $\div 27 =$ cubic yards of sand
 - C. Cubic yards of sand $\times 1.3 =$ tons of sand

An extra 10-20% is usually added to the totals to allow for waste in handling and compaction. For this illustration, an added 15% is used.

D. Tons of sand $\times 1.15 =$ tons of sand required



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Example: Calculate the amount of sand required for a 4" layer on a 2,000 square foot bunker.

- A. $2,000 \text{ sq ft} \times .33' = 667 \text{ cu ft}$
- B. $667 \text{ cu ft} \div 27 = 25 \text{ cu yds}$
- C. $25 \text{ cu yds} \times 1.3 = 33 \text{ tons}$
- D. $33 \text{ tons} \times 1.15 = 38 \text{ tons of sand required for a 4" layer}$

2. Simplified formula for calculating tons of 4" sand layer, with fairly accurate results:

Square feet of area to cover $\div 54 =$ tons required

Example: Calculate the amount of sand required for a 4" layer on a 2,000 square foot bunker.

$2,000 \div 54 = 37$ tons of sand required for a 4" layer

6" sand layer: tons of sand to cover a given area

1. A. Area to cover, in square feet $\times .50$ feet = cubic feet of sand
- B. Cubic feet of sand $\div 27 =$ cubic yards of sand
- C. Cubic yards of sand $\times 1.3 =$ tons of sand

An extra 10-20% is usually added to the totals to allow for waste in handling and compaction. In this illustration, an added 15% is used.

D. Tons of sand $\times 1.15 =$ tons of sand required

Example: Calculate the amount of sand required for a 6" layer on a 2,000 square foot bunker.

- A. $2,000 \text{ sq ft} \times .50' = 1,000 \text{ cu ft}$
- B. $1,000 \text{ cu ft} \div 27 = 37 \text{ cu yds}$
- C. $37 \text{ cu yds} \times 1.3 = 48 \text{ tons}$
- D. $48 \text{ tons} \times 1.15 = 55 \text{ tons of sand required for a 6" layer}$

2. Simplified formula for calculating tons of 6" sand layer, with fairly accurate results:

Square feet of area to cover $\div 36 =$ tons required

Example: Calculate the amount of sand required for a 6" layer on a 2,000 square foot bunker.

$2,000 \text{ sq ft} \div 36 = 56$ tons required for a 6" layer

4" gravel layer: tons of gravel to cover a given area

1. A. Area to cover, in square feet $\times .33$ feet = cubic feet of gravel
- B. Cubic feet of gravel $\div 27 =$ cubic yards of gravel
- C. Cubic yards of gravel $\times 1.3 =$ tons of gravel

An extra 5-15% is usually added to the totals to allow for waste in handling gravel. For this illustration, an added 10% is used.

D. Tons of gravel $\times 1.10 =$ tons of gravel required



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Example: Calculate the amount of gravel required for a 4" layer on a 5,000 square foot green.

- A. $5,000 \text{ sq ft} \times .33' = 1,650 \text{ cu ft}$
- B. $1,650 \text{ cu ft} \div 27 = 61 \text{ cu yds}$
- C. $61 \text{ cu yds} \times 1.3 = 79 \text{ tons}$
- D. $79 \text{ tons} \times 1.10 = 87 \text{ tons of gravel required for a 4" layer}$

2. Simplified formula for calculating a 4" gravel layer, with fairly accurate results:
Square feet of area to cover $\div 56 =$ tons required

Example: Calculate the amount of gravel required for 4" layer on a 5,000 square foot green.

$5,000 \text{ sq ft} \div 56 = 89 \text{ tons of gravel required for a 4" layer}$

ESTIMATING FILL DIRT AND TOPSOIL VOLUMES

The volume of fill or topsoil required for a job can be estimated using the following formula:
Volume = surface or cross-sectional area \times thickness or length

In order to use this formula, the following must be true:

- Units must be the same for all variables (i.e. area in square feet and length in feet; area in square yards and length in square yards; etc.)
- The thickness and shape of the layer applied is reasonably uniform, or the cross-sectional area is uniform for the length of the shape. (e.g., topdressing a green; or a section of drainage ditch)

Procedure:

1. Convert all measurements to the same units.
(Use common units that will give numbers of a reasonable magnitude to work with.)
2. Compute the volume.
3. Change the answer to the desired units.

Example 1: How many cubic yards of topsoil would be required to spread a layer 1" thick over an area of 9,500 square feet?

1. Convert to common units: $1" \times (1' \div 12") = 0.08333'$
2. Compute the volume:
 $0.08333' \times 9,500 \text{ sq ft} = 791.6 \text{ cu ft}$
3. Convert to desired units:
 $791.6 \text{ cu ft} \times (1 \text{ cu yd} \div 27 \text{ cu ft}) = 29.3 \text{ cu yds}$

Example 2: How many cubic yards of soil would be required to fill a ditch 50 feet long with a cross-sectional area of 9 square feet?

1. Convert to common units: Units are already the same.
2. Compute the volume:
 $50' \times 9 \text{ sq ft} = 450 \text{ cu ft}$
3. Change answer to desired units: $450 \text{ cu ft} \times (1 \text{ cu ft} \div 27 \text{ cu ft}) = 16.7 \text{ cu yds}$

We would like to thank the following for providing materials for this reference section:

Greensmix
Highland Golf
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