Economics of Painting

The experienced coating engineer and applicator recognizes that the best way to evaluate cost is on a cost per square foot per year basis. To properly make a cost evaluation, consider the cost of surface preparation methods, the cost of materials, and the type of system needed to withstand various corrosive atmospheres.

Cost of Coating Application

The cost of application of any coating system is based primarily on productivity. While the main control of productivity lies in the hands of the applicator, there are ingredients to consider when estimating the cost and rate of application of each selected coating system. You must take into account equipment cleaning time, physical distribution, fatigue time, material preparation, and generic system time requirements. The following are recommended rates for a single package alkyd material taking the above into account.

Method	*Rate-Sq. Ft./Hr.*
Spray	300 to 600
Roller	200 to 400
Brush	100 to 200

Experience proves a three coat 5 mil dry system may last three times as long as a two coat 3 mil system. The three-coat system actually costs less because it can be maintained by an annual spot painting, whereas the thinner system will require complete removal to be recoated. In the end, the coating system with low initial installation cost will cost more. No amount of inspection or touch-up can take the place of a properly recommended and cost evaluated system.

Estimating Cost of Materials

It is important that you always consider the protective properties and volume of solids of some generic types.

Assuming protective properties of same generic types are equal and the percentage of solids by volume are not, to get a comparable cost use the following calculation:

$$C = \frac{P}{S \times 16.04}$$ (100% utilization at 1 mil thick)

Where
C = Cost/sq. ft. at 1 mil thick, in dollars
P = $ Price/gallon
S = % non-volatile * solids by volume

*Non-volatile = non-evaporative or portion of paint left on surface after solvent or water has been evaporated.

As you can see, a coating should not be purchased on a cost per gallon and square foot coverage basis. A paint low in solids will cover a large number of square feet but the paint film will be too thin to give protection. Coverage and amounts of materials should always be calculated based on square foot per gallon at recommended mil thickness for protection of the surface. You must always consider the suggested life of service in the coating system.

In all cases, spot priming should be done before any major rust or corrosion appears. If this is done regularly it will cut down tremendously on the cost of surface preparation. When more than 10% of the surface needs repair, it is more economical to repaint properly.

Estimating Coverage

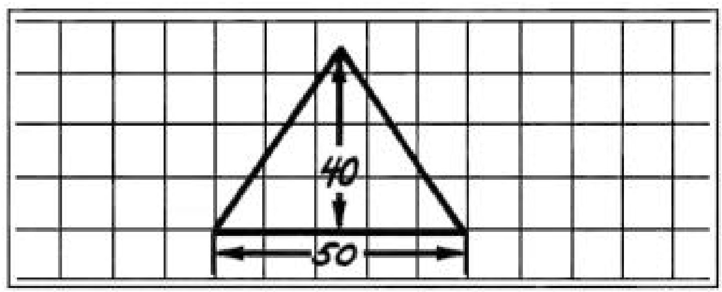
Estimating Square Foot Coverage for Different Shapes

Triangle

To find the number of sq. ft. in any shape triangle or 3-sided surface, multiply the height by the width and divide the total by 2.

40’ height
x 50’ width
2,000 sq. ft.

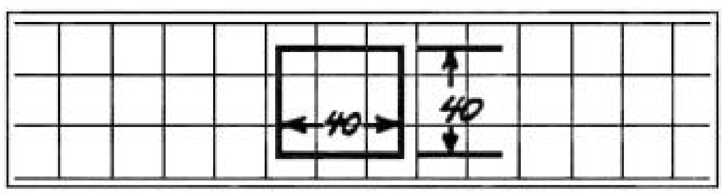
1,000 sq. ft.
2 ⟌ 2,000



Square

Multiply the base measurement in feet times the height in feet.

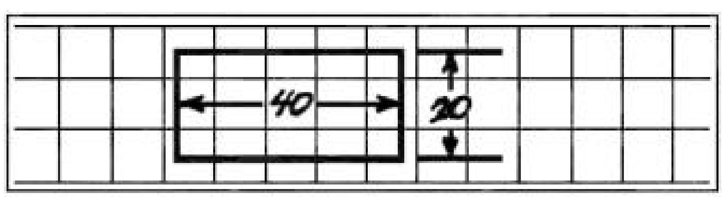
40’ X 40’ = 1,600 sq. ft.



Rectangle

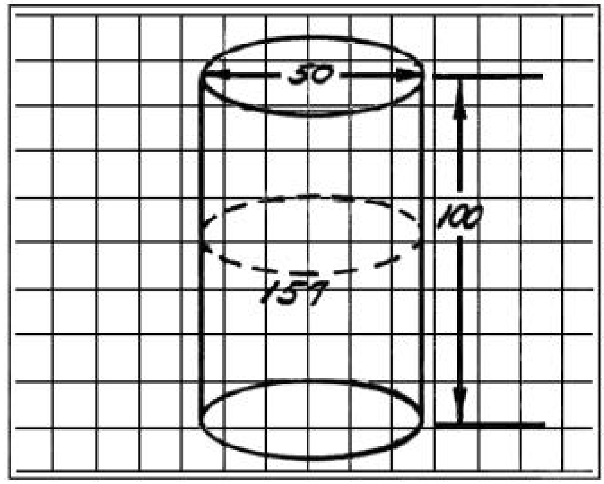
Multiply the base measurement in feet times the height in feet.

20’ X 40’ = 800 sq. ft.



Cylinder

When circumference (distance around cylinder) is known, multiply height by circumference.



157’ circumference
x 100’ height
15,700 sq. ft.

When diameter (distance around) is known, multiply diameter by 3.1416. This gives circumference. Then multiply by height.

3.1416	157’ circumference
x 50 diameter	X 100’ height
157.0800 feet	15,700 sq. ft.

Note: Figures do not include end area. See Circle.

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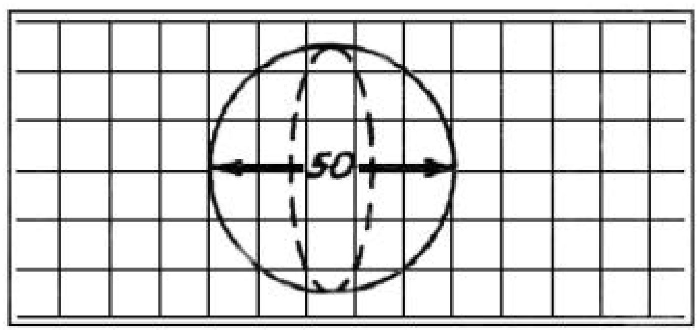
Sphere

To find the number of sq. ft. of a sphere or ball, multiply the diameter (distance across) by itself and then multiply this total by 3.1416. Find the diameter by measuring the circumference and multiplying it by .31831.



50’ diameter	2,500
x 50’ diameter	x 3.1416
2,500	7,854.0000 sq. ft.

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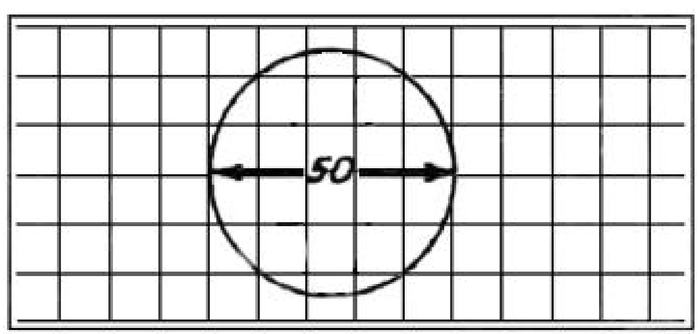
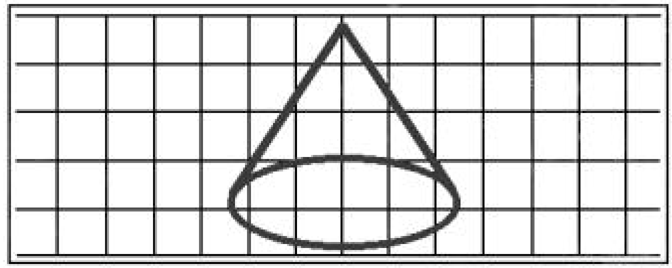
Circle

To find the number of sq. ft. in a circle, multiply the diameter (distance across) by itself and then multiply this total by .7854.



50’ diameter	2,500
x 50’ diameter	x .7854
2,500’	1,969 sq. ft

Cone



Determine area of base by multiplying 3.1416 times radius (in feet) squared. Then determine area of side of cone by multiplying the circumference of base (in feet) times one-half of the slant height (in feet). Add the square foot area of the base to the square foot area of the cone side for total square foot area.

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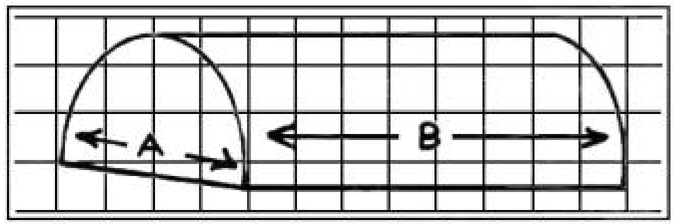
Calculating Other Ordinary Surface Areas

Arch Roof



Multiply length (B) by width (A) and add one-half the total.

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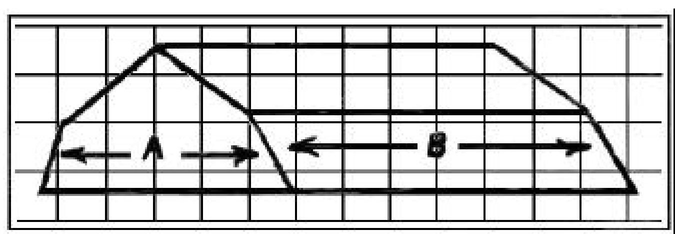
Gambrel Roof



Multiply length (B) by width (A) and add one-third of the total.

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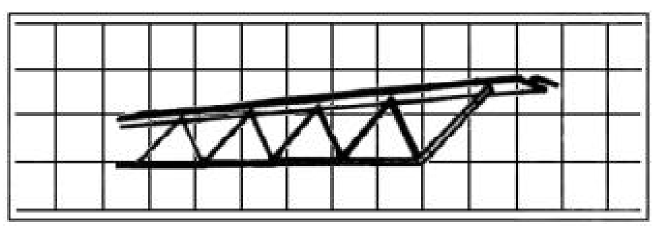
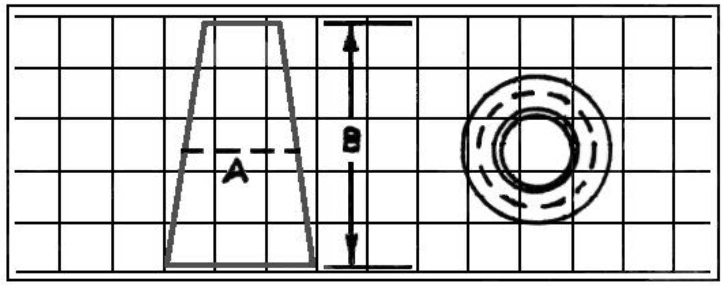
Open Web Steel Joists



Original equipment manufacturers and fabricators generally dip these joists, as a first or shop coat. On all repaint work by spray, manufacturers recommend the paint be estimated by considering the joist as a solid rather than as an open web. Double for both sides.

Stacks

To compute the square foot area of a stack multiply the height (B) by the average diameter (A) and multiply that total by 3.



Example: Diameter of stack at the top – 5 feet. Diameter of stack at the bottom – 15 feet. Average diameter – 10 feet [(5+15) 2]. Height 60 feet. 60 X 10 = 600. 600 X 3 = 1,800 square feet of surface area.

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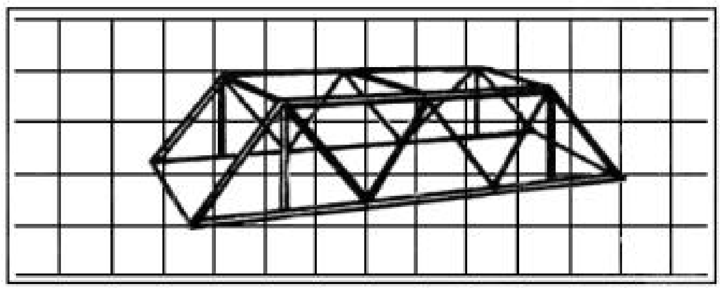
Bridges

To accurately estimate paint requirements for a bridge, inspect the construction to determine the type of structural shapes used. Then use the charts here to determine paint requirements.



Again, it is important to know what method of application will be used before an accurate estimate can be made.

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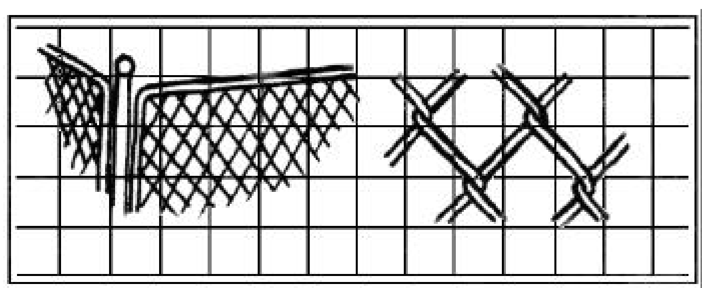
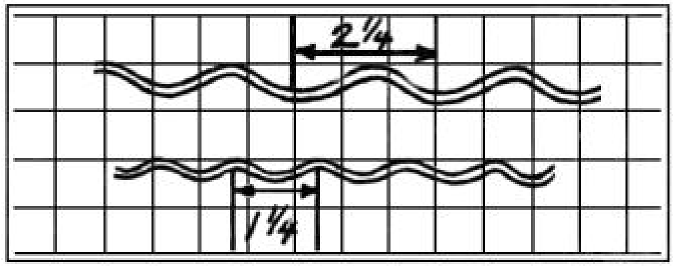
Chain Link Fences

For spray application, figure the square foot area of the fences as a solid because of the overspray. Always double paint requirements for both sides.



In estimating the paint requirements for chain link fences, first consideration should be the method of application. The most economical and recommended method is with an extra-long nap roller. Coverage with this method will generally be higher than that shown on the label or data sheet.

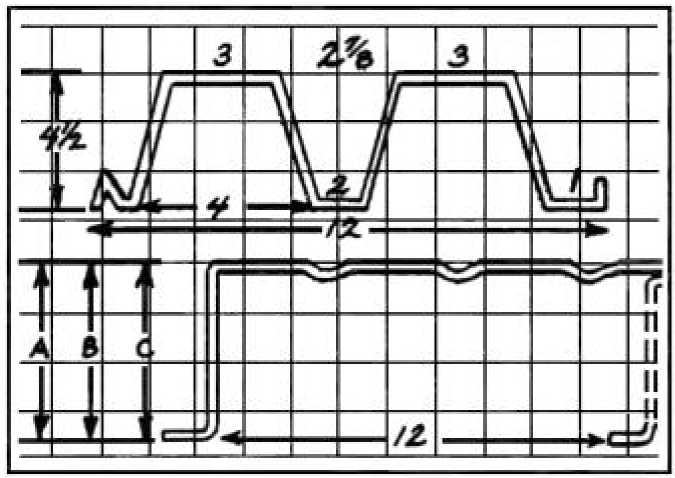
Corrugated Metals



2-1/2" Corrugated Sheet – To find width before corrugation multiply the width after corrugation by 1.08. Assume depth to be 5/8"

1-1/4" Corrugated Sheet – To find width before corrugation multiply the width after corrugation by 1.11. Assume depth to be 3/8"

Roof Deck

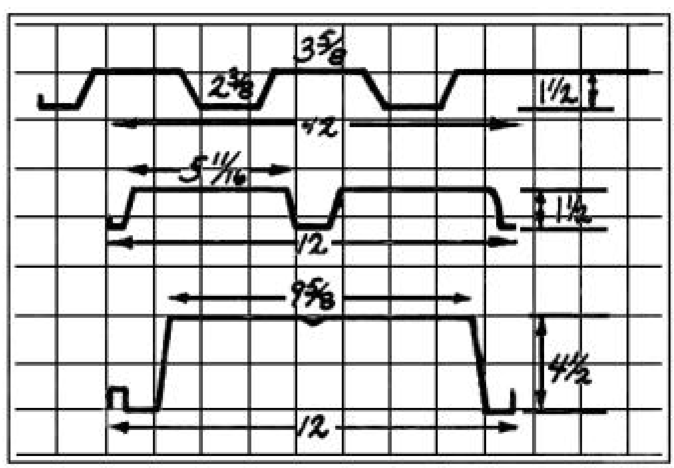


If the roof deck has a cross-section view similar to that in the drawing, first figure the square foot area, then multiply by 2.42 to obtain the actual surface area.

If the roof deck has a cross-section view similar to that in the drawing, figure the topside as just the square foot area of surface. Figure the underside as follows:

A. For each square foot area multiply by 1.63 for actual surface area.
B. Multiply by 1.75
C. Multiply by 1.92

Siding



If the siding has a cross-section view similar to that shown here, multiply each square foot of area by 1.5 for actual surface area. Double for both sides.
If the siding has a cross-section view similar to that shown here, multiply each square foot of area by 1.42 for actual surface area. Double for both sides.

If the siding has a cross section view similar to that shown here, multiply each square foot of area by 1.75 for actual surface area. Double for both sides.

Elevated Water Tanks

To estimate the square foot area of a tank do the following:

1. To find the end areas of a tank:
   Multiply the square of the diameter by .7854.
2. To find the circumference of the tank:
   Multiply the diameter by 3.1416.
3. To find the area of the wall of the tank:
   Multiply the height by the circumference.

Surface Area of Elevated Water Tanks*			
Capacity (Thousand Gallons)	Riser (Diameter)	Inside Area (Square Feet)	Outside Area▼ (Square Feet)
50	4’	3.150	6.500
100	4’	4.300	8.000
150	4’	5.100	9.900
200	4’	5.900	11.100
250	4’	6.700	12.700
500	5’	10.000	19.600
750	Dry 8’	13.600	29.100
1000	Dry 8’	17.000	36.900
* Low Water Level 100’ above grade.			
▼ Includes supporting columns.			

Example: Suppose the tank is 30 feet across and 50 feet high. The square of the diameter then is 900 feet (30 X 30). Which when multiplied by .7854 shows 706.9 square feet at the top of the tank. The diameter of 30 feet multiplied by 3.1416 shows that the tank is 94.3 feet around. The circumference of 94.3 multiplied by the height of 50 feet equals 4,715 square feet – area of the wall.
Total area of approximately 5,425 square feet.

Any accessories such as piping, valves, rails, structural work, etc., would have to be estimated separately.

Surface of Spheres			
Diameter in Feet	* Surface of Sphere in Square Feet	Diameter in Feet	* Surface of Sphere in Square Feet
20	1.257	50	7.854
25	1.963	55	9.503
30	2.827	60	11.310
35	3.848	65	13.273
40	5.027	70	15.394
45	6.362		
* Outside surface area only – double surface area for inside and outside.			

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