Math 1435 – Volume, chemical mix and glue Calculations

# Practice Problems

1. What is the volume of a cone that has a diameter of 42” and a height of 27”? (Calculate in cubic feet)
2. What is the volume of a cylinder with a radius of 18” and a height of 60”? (Calculate in cubic feet)
3. What is the volume of a 48’ trailer with a width of 102” and a height of 110”?
4. You are mixing a sealer for your project. The mixture calls for 5 parts varnish to 2 parts varsol. How much of each chemical do you need if you require a total of 750ml of sealer?
5. You are making a piece of furniture that will be finished with an oil rubbed finish. You will require 3.2L total of finish to complete the job. How much of each ingredient will you need to end up with the total volume? The receipt calls for 7 parts varnish, 2 parts varsol, and 3 parts mineral oil.

## Given the mix ratio on the attached page, calculate the following glue requirements.

1. We are pressing 36 – 3 ply panels that are 54” x 18”. What is the total amount of glue by weight needed for this job?
2. The next job at the hot press is for 120 – 5 ply panels that are 42” x 6”. What is the total amount of glue by weight needed?
3. We have calculated the total required amount of glue for our next hot press job to be 8450 grams of glue. Calculate the amount of resin, catalyst and water needed for this job.

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# Hot Press Glue details

*Mix ratio:*

Resin – 20 parts

Catalyst – 4 parts

Water – 1 part

Waste: 10%

Coverage: 20g/sqft

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# Answer Key

1. V cone = 42”Ø= 21r = (21”/12’)=1.75’r 27”height =2.25’

=

=

=

= 7.215845626 ft³ **or 7.22 ft³**

1. V cylinder = r²xh 18”r= 1.5’r 60”height= 5’height

=(3.141592654x1.5²)x5

= 7.068583471 x 5

= 35.34291735 ft³ or **35.34 ft³**

1. V cube= LxWxH 102”=8.5’ 110”=9.166666(cont.)’

= 48 x 8.5 x 9.166

= **3,740 ft³**

1. 5 parts varnish 2 parts varsol 750ml total volume

5parts + 2 parts = 7 parts total

750ml / 7 parts = 107.1428571ml per part

**Varnish** = 5 x 107.1428571 = **535.7142857 ml**

**Varsol** = 2 x 107.1428571 = **214.2857142 ml**

1. 3.2L total volume 7 parts varnish 2 parts varsol 3 parts mineral oil

7parts + 2 parts + 3 parts = 12 parts total

3.2L / 12 parts = .2666666(cont.) L per part

**Varnish** - 7 x 0.266666 = **1.866666667 L**

**Varsol** – 2 x 0.266666 = **0.533333333 L**

**Mineral Oil** – 3 x 0.266666 = **0.8 L**

1. 36 – 3 ply panels – 54”x 18”

***Sqft of 1 glue line*** – 4.5’ x 1.5’ = 6.75 ft² (54”=4.5’, 18”=1.5’)

# of glue lines x sqft of 1 glue line x # of panels

2 x 6.75 x 36 = 486 ft² (total glue lines)

***Coverage***: 20g/sqft

486 ft²x 20g per ft² = 9,720g of glue + 10% waste = **10,692g of glue needed**

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# Answer Key (cont.)

1. 120 – 5 ply panels – 42”x 6”

***Sqft of 1 glue line*** – 3.5’ x 0.5’ = 1.75 ft² (42”=3.5’, 6”= 0.5’)

# of glue lines x sqft of 1 glue line x # of panels

4 x 1.75 x 120 = 840 ft² (total glue lines)

***Coverage***: 20g/sqft

840 ft²x 20g per ft² = 16,800g of glue + 10% waste = **18,480g of glue needed**

1. Total glue 8450g (waste is included in this number)

Resin – 20 parts Catalyst – 4 parts water – 1 part

20 parts + 4 parts + 1 part = 25 parts total

8450g/ 25 parts = 338g per part

**Resin** – 338g x 20 parts = **6,760g**

**Catalyst** – 338g x 4 parts = **1,352g**

**Water** – 338g x 1 part = **338g**