



THINNING FORMIC ACID TO 65%

If you are not sure of the concentration of the acid purchased, use a specific weight hydrometer to verify the strength of the acid before thinning. The following are approximate specific weights in grams for one milliliter of:

- 65% acid ~ 1.150
- 85% acid ~ 1.200
- 95% acid ~ 1.230
- water ~ 1.000 g

A common automotive battery tester with a specific weight scale will do.

A suitable 5 US gallon container with extra taps and caps approved for transportation of acid is easy to obtain. The picture shows square, five-gallon jug with a 70mm closure, 900-gram weight sold in a 12-pack available from: DADANT or MANN LAKE bee supplies. Large orders can be both from manufacturer SFB Plastics. Wichita KS. 800-343-8133 These can be shipped to Canada too, especially if you are close to the border and can pick them up in the US



THINNING FORMULAS AND JUGS PRODUCED FROM ONE BARREL OF:

Acid concentration "X" lbs of water put into container to finish with 43 lbs. of 65% acid.

85% acid = 10.75 lbs water + pour in acid to total weight of 43 lbs. of 65% mix will fill 16.6 jugs

90% acid = 12.3 lbs water + pour in acid to total weight of 43 lbs. of 65% mix will fill 17.4 jugs

95% acid = 14.3 lbs water + pour in acid to total weight of 43 lbs. of 65% mix will fill 18.2 jugs

THINNING FROM & TO 5 GALLON KEGS or JUGS



All that you need are rubber gloves, boots and pants, also a respirator. Put empty jug onto scale. Zero it, and pour in it required lbs. of clean water from the hose. Put in large funnel and pour in Formic Acid to a total weight of 43lbs. You now have 43 lbs. of 65% Formic acid which is exactly what the commercial DK-162 Kit needs to fill all pads inside it. See picture #2.

Modify the amount of water according to acid concentration you have.



BASIC RULES

All work is done in open air, preferably in an open or drive through storage shed like you see on the picture, where the roof provides shade cover from the sun, protects from wind and rain, but also provides a clean air draft. If you have barrels on truck you leave them there and start thinning. They are very easy to move when they are empty.



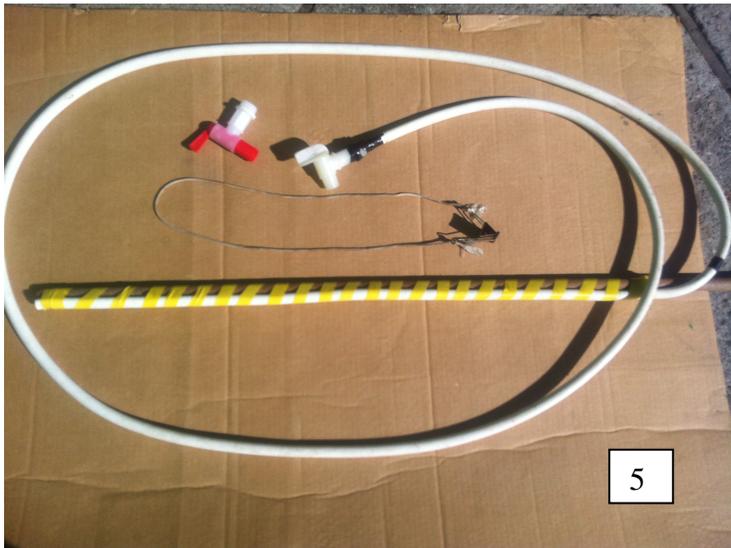
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The postal scale as you see on the picture in pounds and kilos is ideal for this work. The scale is on the ground covered with piece of 6 MIL plastic and the display is fastened to the wall so the operator can easily read it.

EQUIPMENT REQUIRED FOR BARREL THINNING



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SUCTION HOSE

16 to 20 feet of semi-rigid 5/8" hose depending on your set up to reach from the barrels on truck to the thinning station with a scale.

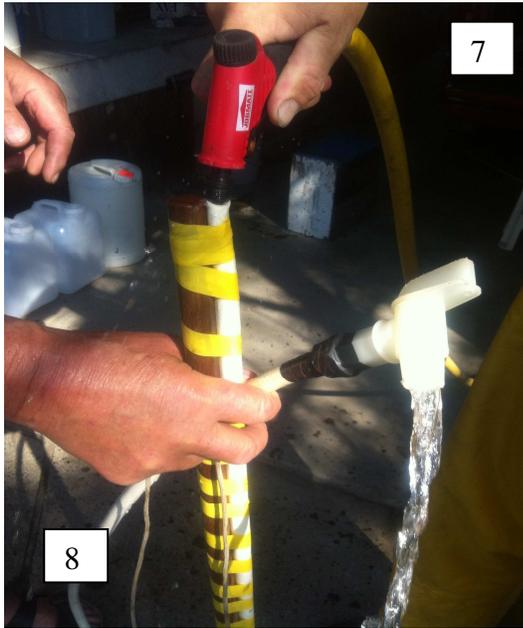
The barrel end has wooden 1/2 " rod 42" long with the hose being taped to it for 36".

On the other end the hose is inserted over 5/8" hose to 3/4 NPT adaptor screwed into 3/4 NPT coupling with a 3/4 NPT plastic tap. I have large supply of the taps with the red handle which are much easier to turn than the white ones. Call me.

On the top of barrel picture, you see a strong 40" long shoe lace and a big paper clamp to go over the hose to tie the hose to the neck of the barrel so it cannot be accidentally pulled out of the barrel as you see on the picture on the right side. Please note that the shoe lace is wrapped around the neck twice.



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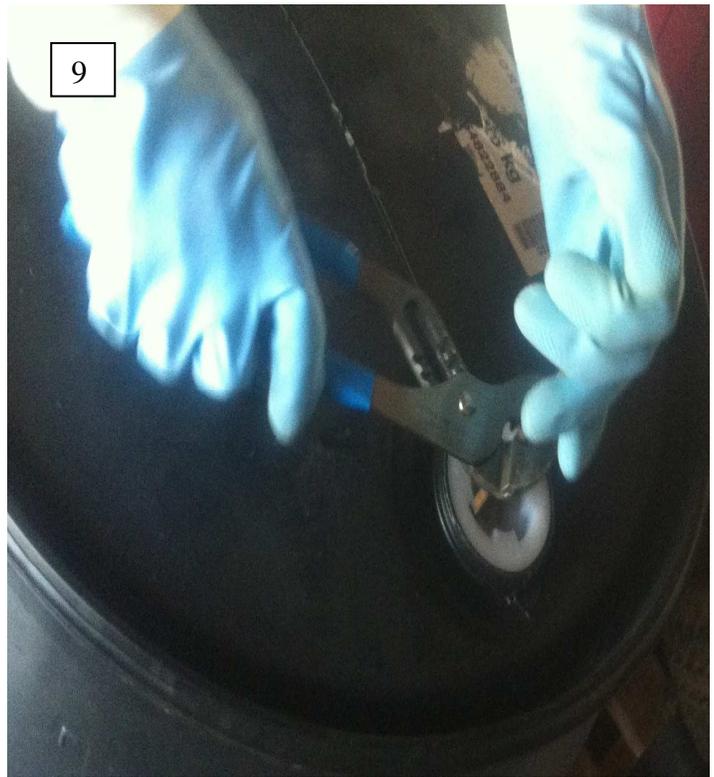
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FILLING AND PRIMING SUCTION HOSE

To prime the hose hold both ends up beside each other with the tap open, with the water hose through the end of the hose at the end of the rod, fill the hose with water until it runs out of the tap. Close the tap. Put any container onto the scale and zero it. Put the end of the hose into it and open the tap and blow out all water out of the hose into the container to know how much water inside of the hose weighs. (Record it as **Y** for filling first jug.) Repeat the instruction to refill the hose with water, ready to use.

OPENING BARREL AND THINNING IT



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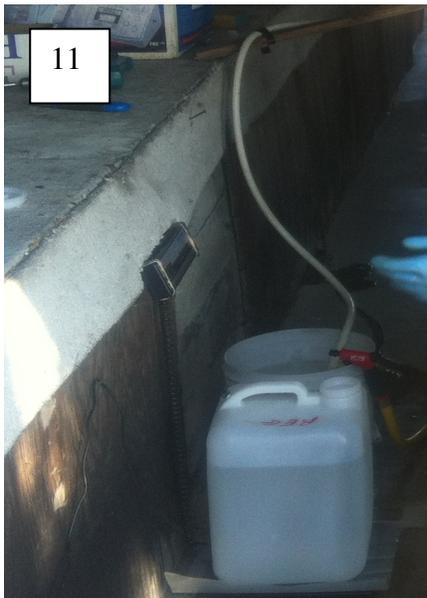
You need a piece of steel to fit between the wrench opening of plug and large channel lock pliers. Turn to the right and

unscrew the plug. Insert the suction hose into barrel and fasten it as you saw in picture #6.

Support the hose on its way from truck to filling station by a piece of board across the gap from truck to filling station and tape it to it with electrician tape. Please note on the picture #11, that both the water hose and the acid hose finish in a pail of water to keep them constantly clean of acid.



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On the above picture #10 of FILLING STATION; please note the line of 5-gallon jugs. I have a supply of these jugs with spare lids and the red taps you saw on picture # 1. They also have 10 mm caps on vent hole.

FILLING THE FIRST JUG

The thinning formula is put in “X” lbs of water and fill up to total weight of 43 lbs with acid **you have**. However, on the first one, you have” Y” lbs of water in your hose, therefore, in the first jug to be thinned you put in less than X lbs of water. = X-Y

IF YOU ARE THINNING MORE THAN ONE BARREL

Put in last jug X lbs water less the hose water weight like you did on keg #1. Re-prime the hose as in picture #7. Open new barrel. Put the hose and rod in as in picture #6 and fill last jug up to 43 lbs. Continue on the next jugs as in # 10 and #11. If you have more barrels, repeat above process. If you are finished, clean up as in #12.

LAST JUG FILLED FROM LAST BARREL:

Make sure that the barrel is tilted at least 6 inches by a 2x4 support on opposite side of the opening and neck you are using, and the wood rod with the end of hose is inserted into the lowest point of barrel. Zero the scale and tap into keg only the acid until the hose sucks all remaining acid and runs dry. Lift and empty the rest of the hose into the keg. The scale tells you how much acid is there.

Tap one quarter of that weight of water into the jug if you have 85% acid

Tap one third of that weight of water into that jug if you have 95% acid to make the remainder 65% acid.

CLOSE UP AND CLEAN UP:



Carefully remove the hose from barrel and wash on outside and flush on inside with a lot of clean water. Then let it dry and put it into storage. Take the empty barrel and fill it with 20 lbs of water. Close it and roll it on the concrete to wash barrel out. Dump out water and repeat. Let barrels dry. They are ready for return or re-use. Wash all spills on JUGS before storage.

STORING OF ACID (see Safe use and handling of liquid Formic acid.)

Store the thinned acid in a dark place with moderate freezing of -8°C/22°F to temperature of 30°C/ 87°F The old cellars are ideal for storage.