calculate intermediate values. For anhydrous ammonia, use: specific gravity = 0.6182

3. Let Sg_o = specific gravity of anhydrous ammonia or original concentration aqua ammonia

Sg_f = specific gravity of final concentration aqua ammonia

Sg_w = 1.0000 specific gravity of water

4. Two facts are known. First, the weight of the original anhydrous ammonia or aqua solution plus the weight of the water added must equal the weight of the final solution. Second, the weight of the ammonia (NH_3) present originally (either as anhydrous ammonia or in the original aqua ammonia) must equal the weight of the ammonia (NH_3) in the final solution. Therefore, two equations with two unknowns are generated from which desired values can be calculated. The "ammonia equation" becomes $(V_o)(SG_o)(C_o) = (V_f)(SG_f)(C_f)$ and the "weight equation" $(V_o)(SG_o) + V_w = (V_f)(SG_f)$.

Example: What volume anhydrous ammonia (NH_3) would you add to what volume of water to obtain 1,000 gallons of 29.4% aqua ammonia?

The "ammonia equation" becomes:

$V_o = V_f(SG_f)(C_f)/(SG_o)(C_o)$

or $V_o = 1{,}000(0.8974)(0.294)/(0.6182)(1.00)$

or $V_o = 426.7$ gallons

The "weight equation" becomes:

$V_w = (V_f)(SG_f) - (V_o)(SG_o)$

or $V_w = (1{,}000)(0.8974) - (426.7)(0.6182)$

or $V_w = 633.6$ gallons

Note that 426.7 + 633.6 does not equal 1,000. There has been a decrease of about 6% in volume in the mixing process.

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