Procedure to Dilute Concentrated Sulfuric Acid

Sulfuric Acid is a very strong diprotic acid that reacts with water as follows:

$$H_2SO_4 + H_2O \rightarrow HSO_4^- + H_3O^+ \text{ and } HSO_4^- + H_2O \rightarrow SO_4^{-2} + H_3O^+$$

Safety: Use extreme caution when diluting Sulfuric Acid and never add water to concentrated H_2SO_4 because the reaction is highly exothermic. Dilutions should always be carried out under a fume hood and when dealing with concentrated acid the reaction vessel/beaker may be immersed in a water bath to cool the solution and to avoid glass cracking under the high temperatures. After making a dilution, allow the solution to cool overnight in a ventilated area and do not secure the lid on the container until it has come back down to room temperature.

The following personal protection equipment must be worn:

- Safety glasses
- Lab Coat
- Sulfuric acid resist gloves
- Close toed shoes/rubber boots
- Face Shield/goggles

Procedure:

- Ensure proper PPE is being worn and that there is a base nearby such as Sodium Bicarbonate to neutralize any acid spills.
- Calculate dilution using formula $m_1v_1 = m_2v_2$ where m is the molarity of the acid and v is the total solution volume. m_1v_1 are stock molarities and volumes before dilution.
- Place open vessel containing water under a fume hood.
- Slowly add concentrated acid without splashing and stir consistently.
- Monitor solution temperature, should never exceed ~150 degrees F. If so, stop adding acid and wait for solution to cool.
- Continue adding acid until overall solution volume is the volume that you calculated using the formula in the first step. Alternatively, measure out correct amount of acid before.
- Leave solution under fume hood to cool overnight.

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