

Protocol for Buffer Stock Solution 2

Preparation of a buffer stock solution:

- Created from a single buffer
- Buffer components are insoluble without any pH adjustment
- The pH is adjusted by the addition of a counter acid or base

Step 1: Identification of the buffer stock solution characteristics.

The required buffer stock solution concentration and the counter acid/base used to adjust the pH can be found in the production report (see example, Table 1).

Step 2: Calculation of the amount of each chemical required to prepare 1 liter of stock solution.

Amount required in g = molarity (M) x FW x liters of solution

Using the example in Table 1:

Amount of Buffer P required in g = 0.75 x 123.45 x 1 = 92.59 g

Step 3: Buffer stock solution preparation (1 liter).

1. Weigh the required amount of buffer chemical into a beaker.
2. Add water to 75% of the final volume (~750 ml). The buffer chemical remains as a solid at the bottom of the beaker.
3. Slowly add the appropriate counter-acid or base until the pH reaches a value where the buffer component is soluble. Stir the solution thoroughly until all of the buffer chemical is in solution.
4. Bring the pH near to the desired value with the appropriate counter-acid or base.
5. Add water to 95% of the final volume (~ 950 ml).
6. Store the buffer stock solution at room temperature for 24 hours*.
7. Adjust the pH to the desired value.
8. Add water to give a final volume of 1 liter.
9. Filter the buffer stock solution using a 0.22 µm filter.

* Since the acid/base reaction is usually exothermic, this step will bring back the solution to room temperature.

Table 1. Example of Buffer Stock Solution Makeup Found in Production Report

Formulation	Chemical FW
0.75 M Buffer P	123.45
Final pH = 7.5	
Counter-acid/base: hydrochloric acid	

The value of a chemical's formula weight (FW) is the sum of the atomic weights of the atoms found in one formula unit (including its hydration state) of an ionic compound. For other information about each chemical, please refer to the production report specific for each solution.

Things to remember:

- All chemical information can be found in the production report for each solution.
- Amount of chemical required for each solution is calculated thus:

If concentration is given as X M:

$$\text{Amount in grams} = X \times \text{FW} \times \text{FV (liters)}$$

If the concentration is given as X% v/v:

$$\text{Volume required} = X \text{ ml per } 100 \text{ ml}$$

If the concentration is X% w/v:

$$\text{Amount in grams required} = X \text{ g}/100 \text{ ml}$$

Units Definition

M: Molarity of chemical

FV: Final volume of solution

FW: Formula weight of chemical