



## IJSEP Experiment Guide: Required Specificity for Describing Samples

This guide explains how to clearly describe the materials (liquids and solids) used in your IJSEP experiment. The goal is to make sure your experiment is safe and understandable for the flight review committee.

This level of detail should be included from the very beginning, as all experiments must have a complete and precise description of their samples to be eligible for flight selection and safety review.

### 1. Describe Your Samples Clearly

For every material you use, include **as much detail as possible**. Examples:

| Type of Sample  | Example of Description                                                                        |
|-----------------|-----------------------------------------------------------------------------------------------|
| Plant or animal | 3 radish seeds ( <i>Raphanus sativus</i> )                                                    |
| Liquid          | 1.0 ml distilled water; 0.85 ml canola oil                                                    |
| Solid           | 0.1 g Baker's yeast ( <i>Saccharomyces cerevisiae</i> ); 0.5 × 0.5 cm piece of cotton         |
| Microorganism   | <i>E. coli</i> ( $1.4 \times 10^8$ CFU/ml), freeze-dried, volume filled to capacity (~0.9 ml) |

If the tube is completely filled, you can write:

"Filled to capacity, approx. 10 ml (Type 1 FME)."

This means the tube is full, and small variations (like 9.85 ml) are acceptable.

 **Tip:** Always check the maximum volume allowed for your FME Type.



## 2. Include Concentrations

You must show how much of each material is mixed. Examples:

- 5 mg/ml sodium chloride (NaCl) in 1.5 ml distilled water
- 0.06 ml NaCl in 1.23 ml distilled water
- 5% NaCl in distilled water, filled to capacity (~1.85 ml)

If you mix more than one liquid, describe both:

1.0 ml distilled water + 0.85 ml canola oil (Type 2 FME)

If you use solids in liquids, include quantity or size:

60 microspheres (500  $\mu$ m) in distilled water, filled to capacity (~1.85 ml)

## 3. Materials You Cannot Use

### Prohibited:

Do NOT use these substances — they are not allowed for safety reasons.

- Radioactive materials
- Perfumes
- Hydrofluoric acid
- Magnets
- Cadmium
- Beryllium
- Acetone

If any of these appear in your proposal, it will be **automatically rejected**.

### Hazardous and Problematic Samples:

Some materials are **hazardous** even if they are not on the list above. If your sample could be dangerous or react strongly, contact the IJSEP Science Team.

Examples of hazardous samples:

- Materials that release heat, gas, or pressure when mixed.

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- Biological samples that are **BioSafety Level 2 (BSL-2)** or higher.

**Problematic samples** can damage the silicone tube or caps of the FME. These must be checked with the IJSEP team.

### Technology:

Do not include **any technology** (batteries, LEDs, sensors, etc.) inside the FME. These require special flight certification that IJSEP cannot provide.

 See the document “IJSEP Experiment Guide: Materials That Cannot Be Used in Experiments” for the complete list of prohibited materials.

### 4. Examples of Good Descriptions

Here are examples of how to describe your samples properly:

- Cotton: 0.3 × 0.3 cm
- Yeast (*Saccharomyces cerevisiae*): 2 ml
- Madeira wine: Filled to capacity (~1.25 ml)
- 5 *Arabidopsis thaliana* seeds
- 30 lettuce (*Lactuca sativa*) seeds
- Distilled water: Filled to capacity (~8 ml)
- 5% NaCl in distilled water: Filled to capacity (~125 µl)
- DMEM cell culture medium (4.5 g/L glucose + 10% FBS + HEPES): Filled to capacity (~125 µl)
- 4 g calcium sulfate order (Sigma-Aldrich #12090-1KG-R)
- 4 ml distilled water

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### 5. Additional Information

The safety committee requires that you provide the **pH** of all fluid samples. You will also need:

- **Safety Data Sheets (SDS)** for all materials
- **Certificates of testing** for any human biological samples

These documents do not need to be submitted with the proposal, but they must be prepared and ready to present when requested by the IJSEP Science Team.

### Summary Checklist

Before submitting your proposal, make sure you include:

- Full description of all materials (name, amount, size, concentration)
- Safe, non-toxic samples only
- No technology or prohibited materials
- Approximate volume filled if the tube is full
- pH of the samples
- SDS and testing certificates