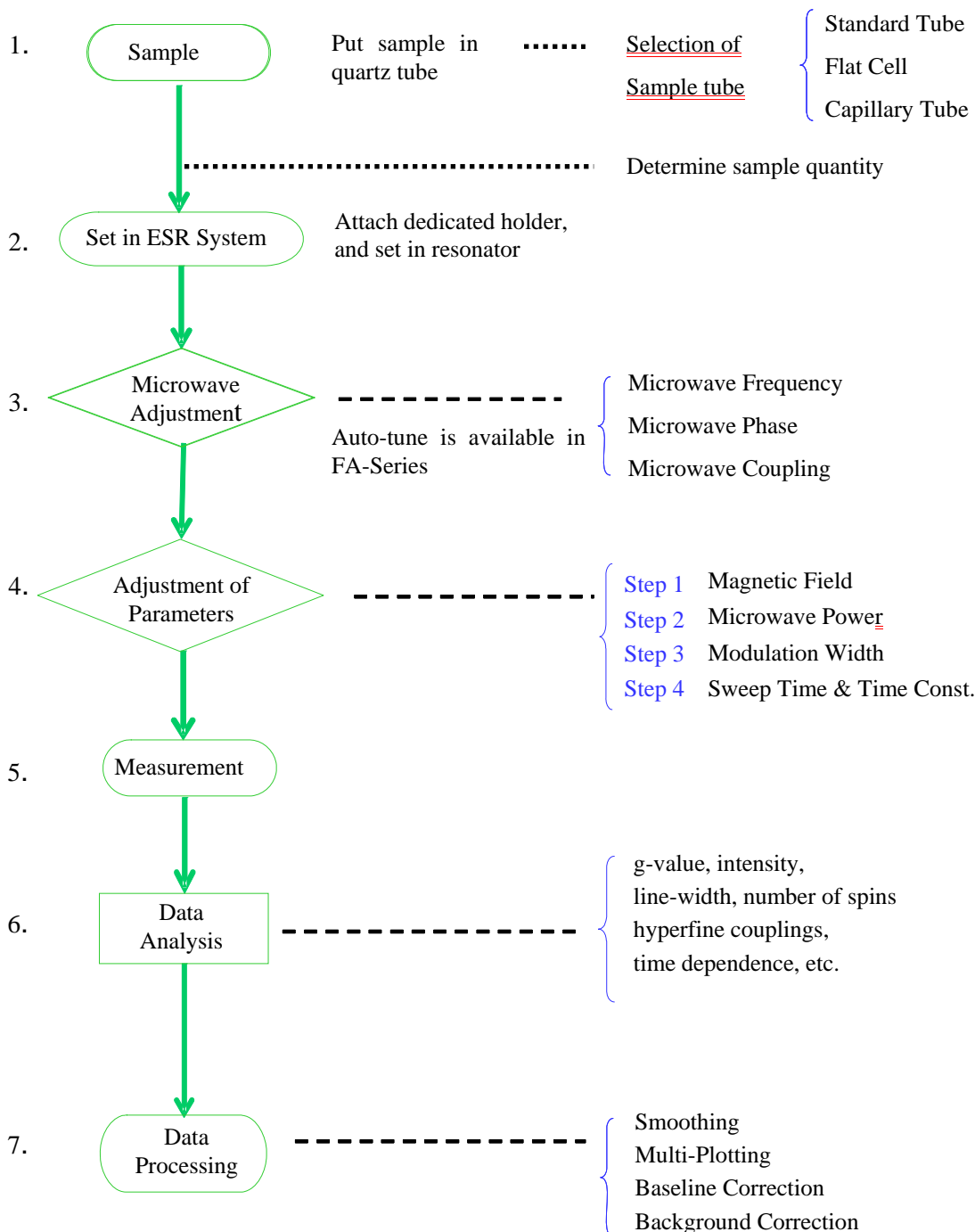


Let's Use ESR I - How to Select the Sample Tube

ESR may be used to measure a wide range of samples. However, it is necessary to determine the most appropriate conditions for each sample. The following measurement flow chart gives a step-by-step approach. Here, we explain how to select the most appropriate sample tube.

ESR Measurement Flow



Sample Type and Sample Tube Selection

Liquid, Solid, Gas **All are possible!**

Straight Pipe Type Sample Tube of 4mm I.D.

Caution: Substance with Large Dielectric Loss

a. Aqueous Solution

- Flat Cell
- Capillary Cell

b. Sample of high moisture content

- Dry
- Use Tissue Cell

c. Conductive substances

- Decrease quantity,
- Use capillary

Fig 1 Straight Standard Sample Tube
(100 mm length tube is also available.)

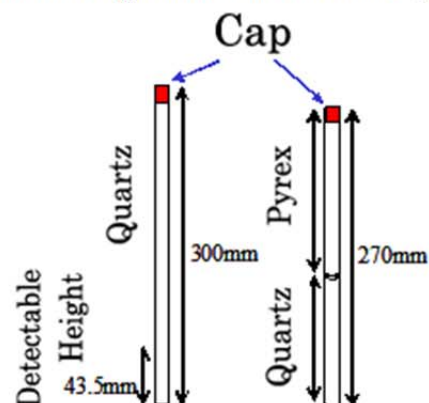
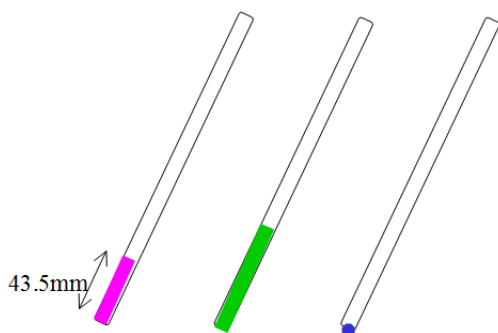


Fig.2. Example of Sample Collection



- (Left) Samples up to 43.5mm high can be measured.
- (Middle) If there is more sample, there is no contribution to the signal.
- (Right) If radical quantity is adequate, even a small quantity of sample gives signal.

The measurement section of the tube is made of high purity quartz. Tubes with the upper part of Pyrex are suitable for glasswork.

Solvents that have a large dielectric loss, e.g. water, chloroform, alcohols, sulfuric acid, etc., or samples that contain more than 10% of these solvents, cannot be measured using the standard sample tube. For a sample in solution, please use a flat cell (Fig. 3), or, if it is a solid sample, use thin pieces in a tissue cell. For measurement using a flat cell, about 200 μ l of solution is needed. For small amounts of sample, use a capillary tube inner diameter 0.8mm or less. Capillary tubes are also suitable as sample tubes for materials with a large dielectric loss. If the measurement is at room temperature, disposable tubes are available. But for low temperature measurements, a quartz capillary tube (2 mm, 2.6 mm, 3 mm O.D.) is suitable as shown in our parts catalogue.

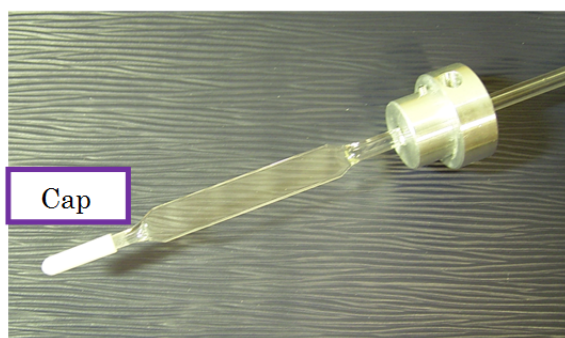


Fig.3. Flat Cell for Aqueous Solution Sample

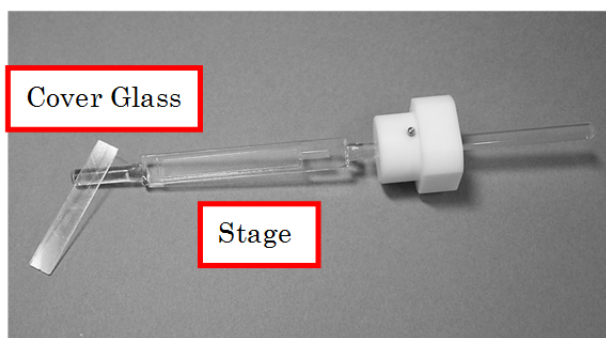


Fig.4. Tissue Cell for Tissue Sample