

FLUKE®

Biomedical

Nuclear Associates

76-801, 76-801-1926

76-804 & 76-807

Flood Phantoms

Users Manual

**Fluke Biomedical
Radiation Management Services**

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Section 1

General Information

1.1 Introduction

Flood Phantoms offer a simple, efficient means of obtaining optimum camera performance with respect to uniformity of response over the entire crystal area. They consist of plastic forms that contain a watertight central cavity into which a radioactive solution is introduced (via a filling port) and then mixed thoroughly. After the activity has been distributed evenly, the camera's uniformity of response can be checked.

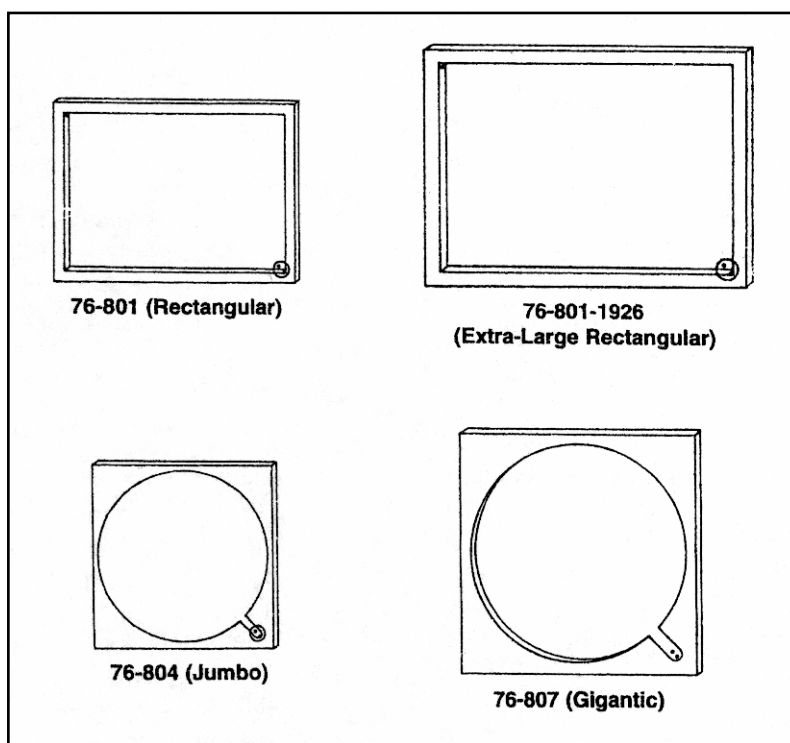


Figure 1-1. Flood Phantom Models

1.2 Specifications

Rectangular Flood Phantom (76-801)

Dimensions	18" x 23" x 1" thick
Cavity Dimensions	16" x 21" x ½" deep
Weight	10 lbs

Extra-Large Rectangular Flood Phantom (76-801-1926)

Dimensions	20½" x 28" x 1¼" thick
Cavity Dimensions	18½" x 26" x ½" deep
Weight	20 lbs

Jumbo Flood Phantom (76-804)

Dimensions	18" x 18" x 1" thick
Cavity Dimensions	17" x 17" x ½" deep
Weight	9 lbs

Gigantic Flood Phantom (76-807)

Dimensions	23" x 23" x 1" thick
Cavity Dimensions	22" x 22" x ½" deep
Weight	13 lbs

1.3 Filling the Phantom

The filler and vent plugs of these phantoms are located on the flat surface rather than on one of the edges. Filling the phantom through openings on the edge requires that the phantom stand up on the opposite edge. This causes water pressure to develop on the flat faces, making them bulge. These bulges remain, even when the phantom is placed horizontally, causing non-uniformities in the distribution of radioactivity. By filling the phantom in the flat or horizontal position (with the filling vent corner raised a fraction of an inch, so as not to trap air), water pressure build-up due to depth is prevented, resulting in a totally non-bulging phantom.

1. Remove the filler and vent plugs and the rubber "O" rings.
2. Partially fill the phantom with water to approximately 90% of capacity.
3. Spike the solution in the phantom with an appropriate isotope (5-10 mCi of Tc-99 m is more than sufficient activity).
4. Replace the vent and filler plugs, and rubber "O" rings carefully so that the phantom is properly sealed. (**Do not over-tighten.**)
5. Grasp the flood phantom by the edges and rotate it so that the trapped air serves to mix the spike and carrier solution. Thirty seconds is sufficient to insure homogeneity of the mixture.
6. Remove the filler and vent plugs and carefully fill the flood phantom completely with degassed water. Remove any trapped air by lightly tapping the face of the phantom.
7. Replace the filler and vent plugs in a controlled area and make sure that no leaks are present.

NOTE

If a small bubble of air remains, raise the filling corner of the phantom by tilting the camera detector about 1/8" to 1/4", so the bubble will remain in the side arm of the liquid-filled region.

The flood phantom is now ready to use.

1.4 Draining the Phantom

To empty the phantom, remove both the filler and vent plugs and the "O" rings, and invert over an appropriate drain. Remove the drain vent plug now located on the top edge of the phantom.

CAUTION

Make sure that the radioactive solution being drained is below the maximum permissible concentration, which the N.R.C. (or your agreement state) will allow to be discharged into public drainage systems. If it is not, (a) hold the solution in a separate container until it decays below this value or (b) dilute the solution below the maximum permissible level.

1.5 Maintenance

Cleaning

Use any mild detergent in warm water.

Care of Filler and Vent Plugs

Lubricate the threads of both plugs regularly with good silicone grease or a stopcock lubricant.

CAUTION

Do not use organic solvents, (they will attack the phantom walls). As an algaecide, use 2 cc of copper sulfate solution, made by dissolving 5 grams of copper sulfate in 100 cc of water. Alternatively, use 5 to 10 drops of Lugol's Solution (iodine) or any common swimming pool algaecide (chlorine).

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