

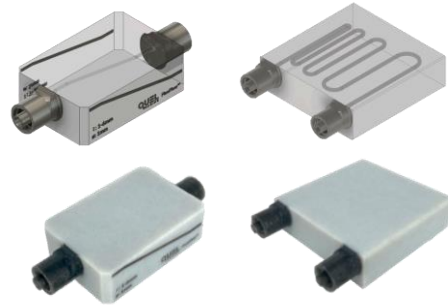
Directions for Use

FluoFlow™ DYNAMIC FLOW TISSUE PHANTOM FAMILY

Flow Phantoms:

VFL-NFL-XXXX-XXXXXX

With standard and custom designs



1. Scope

- a. This document is intended to inform the customer on the normal, day-to-day use and care of this product. Please don't hesitate to contact QUEL Imaging at info@quelimaging.com if there are questions not answered here.

2. Warnings

- a. The QUEL Imaging FluoFlow™ Dynamic Flow Tissue Phantom is intended for use in **characterizing** imaging systems. Products should neither be used as the basis for **calibrating and adjusting** clinical imaging systems nor in clinical care.

3. Intended Use

QUEL Imaging supports the following uses for this product:

- a. Testing of contrast agents (e.g. fluorophores, chromophores, scatterers) in tissue-equivalent optical environments
- b. Testing of dynamic flow applications
 - i. For more technical details, please see our [Downloads and Resources Page](#)

4. Product Limitations

- a. GENERAL:
 - i. The QUEL Imaging FluoFlow™ Dynamic Flow Tissue Phantom is designed for use in research, evaluation, and demonstration environments – at no time should these products be used in clinical care.

5. Storage

- a. Targets should be stored at room temperature (20 to 25°C) and in a light blocking storage container. QUEL Imaging recommends storing the targets in their original shipping packaging for storage.
- b. Remove all tubing from the phantom and clean (see Section 6.E) prior to storing. Keeping the tubing connected to the phantom can cause the luer lock fitting on the phantom to become soft and damage these connection points on the phantom.
- c. Do not store phantom in a sealed environment (i.e. zip lock bag). This can cause the luer lock fitting on the phantom to become soft and damage these connection points on the phantom.

6. Handling/Care

- a. Targets should be handled with gloves to avoid getting dirt and oils on the imaging surfaces. Avoid prolonged skin contact.
- b. The duration for which liquid remains in the flow channel (before cleaning) should be minimized and should not exceed one hour. Extended exposure may cause settling of the chromophores in the channel and prevent proper cleaning, etc.
- c. The phantom should be cleaned **immediately** after use following the cleaning protocol outlined below in Section E. Allowing the liquid in the channel to evaporate before cleaning may result in non-reversible contamination of the phantom.
- d. Imaging Surface Cleaning: Clean imaging surfaces with isopropyl alcohol and soft lint-free material.
- e. Flow Channel Cleaning:
 - i. **Materials:**
 - 10% (v/v) bleach in distilled water (Note: Bleach added to this solution should have a sodium hypochlorite starting concentration of 7-9%)
 - Distilled Water
 - 99.9% Isopropyl Alcohol
 - 3 x 5 mL syringe with luer lock tip
 - 2 x piece of 2 mm (inner diameter) tubing approximately 4 inches long (Note: Clear tubing allows for monitoring fluid flow but is not required)
 - 4 x female luer lock to 1/16" Barb (1.5 mm)
 - 3 containers for waste collection

CAUTION: Do not mix bleach and isopropyl alcohol during the cleaning and waste disposal process! It's crucial to keep bleach and isopropyl alcohol solutions separate to prevent the formation of chloroform, which can occur if they are mixed.

- ii. **Protocol:**
 1. Attach tubing:

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- Attach a luer lock fitting to both ends of a tubing piece, then connect one end of a tubing piece to a luer lock fitting on the phantom. Repeat this for the other port of the phantom using the other piece of tubing.
 2. Assign syringes and containers for waste collection:
 - Assign specific syringes and waste collection containers for 10% bleach, distilled water, and isopropyl alcohol respectively, and label each accordingly.
 3. Rinse with distilled water:
 - Fill the distilled water syringe with 5 mL of distilled water.
 - Attach the syringe to one of the luer locks on the tubing piece.
 - Place the end of the other tube into the distilled water waste container.
 - Inject the water to pass it through the phantom.
 - Remove the syringe from the luer lock and pull back the plunger to the 5 mL mark. Connect the syringe to one of the luer locks on the tubing piece and press the plugger downward completely to remove any remaining liquid from the phantom's channel.
 4. Rinse with 10% Bleach:
 - Fill the bleach syringe with 5 mL of 10% (v/v) bleach in distilled water.
 - Attach the syringe to one of the luer locks on the tubing piece.
 - Place the end of the other tube into the bleach waste container.
 - Inject approximately 2 mL of the bleach.
 - Alternate pushing and pulling the plunger back and forth between the 2-3 mL mark on the syringe 3 times to create air bubbles within the tubing.
 - Inject the rest of the bleach to pass it through the phantom.
 - Remove the syringe from the luer lock and pull back the plugger to the 5 mL mark. Connect the syringe to one of the luer locks on the tubing piece and press the plugger downward completely to remove any remaining liquid from the phantom's channel.
 5. Rinse with distilled water:
 - Fill the distilled water syringe with 5 mL of distilled water.
 - Attach the syringe to one of the luer locks on the tubing piece.
 - Place the end of the other tube into the distilled water waste container.
 - Inject the water to pass it through the phantom.
 - Remove the syringe from the luer lock and pull back the plugger to the 5 mL mark. Connect the syringe to one of the luer locks on the tubing piece and press the plugger downward completely to remove any remaining liquid from the phantom's channel.
 6. Rinse with isopropyl alcohol:
 - Fill the isopropyl alcohol syringe with isopropyl alcohol.
 - Attach the syringe to one of the luer locks on the tubing piece.
 - Place the end of the other tube into the isopropyl alcohol waste container.
 - Inject approximately 2 mL of isopropyl alcohol.
 - Alternate pushing and pulling the plunger back and forth between the 2-3 mL mark on the syringe 3 times to create air bubbles within the tubing.
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- Inject the rest of the isopropyl alcohol to pass it through the phantom.
 - Remove the syringe from the luer lock and pull back the plugger to the 5 mL mark. Connect the syringe to one of the luer locks on the tubing piece and press the plugger downward completely to remove any remaining liquid from the phantom's channel.
7. Remove tubing and dry:
- Remove tubing with the luer lock fittings from the phantom and let dry in ventilated space for 24 hours.