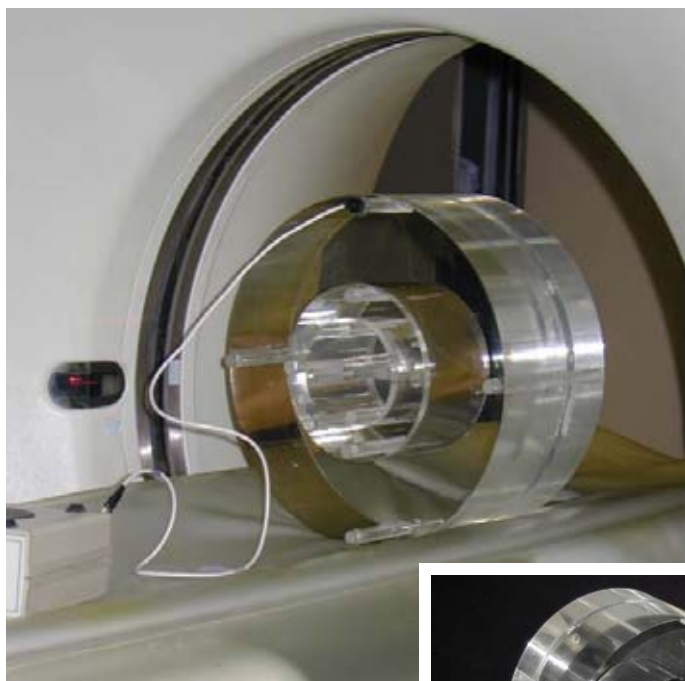


# Nested CT Dose Phantom Kit for Pediatric/Adult Head and Body

## Model 76-424-4156



Diagnostic Imaging



### Introduction

The innovative nested CT Dose Phantom can be used with any computed tomography (CT) system designed to image pediatric and adult head and body. Each phantom segment can provide separate dose information. When performing dose profile measurements, the dose phantoms allow the user to collect information for the maximum, minimum and mid-range value of the nominal tomographic section thickness.

This essential phantom kit consists of three parts: an adult body phantom, an adult head phantom that doubles as a pediatric body phantom and the new pediatric head phantom, nested together for easy storage and convenient transport. (All are made of solid acrylic with diameters of 32, 16 and 10 cm, respectively.) Each part contains four probe holes around the perimeter, 90° apart and 1 cm from the edge and the pediatric head (center insert) has one probe hole in its center. The inside diameter of the holes is 1.31 cm. Each part includes five acrylic rods for plugging all the holes in the phantom. A sturdy storage and carrying case with wheels and pull handle that holds all three phantoms is included; as an option, a smaller case without wheels is available.

### Applications

The CT Dose Phantoms were designed in accordance with the Food and Drug Administration's performance standard for diagnostic x-ray systems, which includes regulations specifically applicable to CT systems (21 CFR 1020.33).



- Uniquely designed for pediatric and adult computed tomography dose index (CTDI) in a lightweight (44 lb, 20 kg) total package
- Can be used with new multi-detector (MDCT) units
- Meets requirements of FDA performance standards
- All new carrying case with wheels and pull handle
- Case includes space for CT Ion Chambers (purchased separately)

### Specifications

#### Weight

**Adult body phantom** 25 lb (11.3 kg)

**Adult head/pediatric body phantom** 5 lb (2.3 kg)

**Pediatric head phantom** 3 lb (1.3 kg)

**3 nested phantoms** 33 lb (15 kg)

#### Dimensions

**Adult body phantom** 15.5 cm long x 32 cm Ø

**Adult head/pediatric body phantom** 15.5 cm long x 16 cm Ø

**Pediatric head phantom** 15 cm long x 10 cm Ø

#### Available model(s)

**76-424-4156** Nested CT Dose Phantom Kit for Pediatric/Adult Head and Body including carrying case with wheels and pull handle

**76-424-4150** Nested CT Dose Phantom Kit for Pediatric/Adult Head and Body including carrying case without wheels and pull handle

#### Other CT Dose Phantoms available

**76-419-4150** CT Dose Phantom Kit for Pediatric/Adult Head and Body including carrying case with wheels and pull handle

**76-419** CT Pediatric Head Dose Phantom with five plugs

**76-414** CT Head Dose Phantom with five plugs

**76-415** CT Body Dose Phantom with five plugs

*For ion chamber selection, see next page.*

# CT Ion Chambers

## Specifications for 10 cc high sensitivity

**Detector type** Vented air ion chamber

**Volume** 10.1 cc

**Sensitive length** 10.0 cm

**Chamber material** Acrylic (PMMA)

**Chamber outside diameter**  
0.5 in  $\pm$  0.015 in  
(12.7 mm  $\pm$  0.4 mm)

**Chamber inside diameter**  
0.45 in (11.44 mm)

**Chamber wall thickness** 77 mg/cm<sup>2</sup>

**Electrode material** Aluminum, 1100

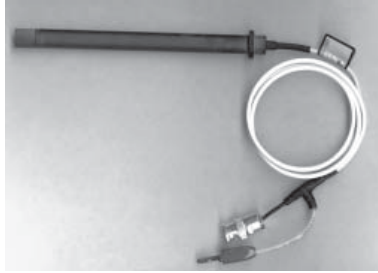
**Sensitivity** 3.2 R•cm/nC (nominal) or 0.3/nC

**Standard calibration** 100 kVCP, 5.5 mm Al HVL (NIST Tech. M100)

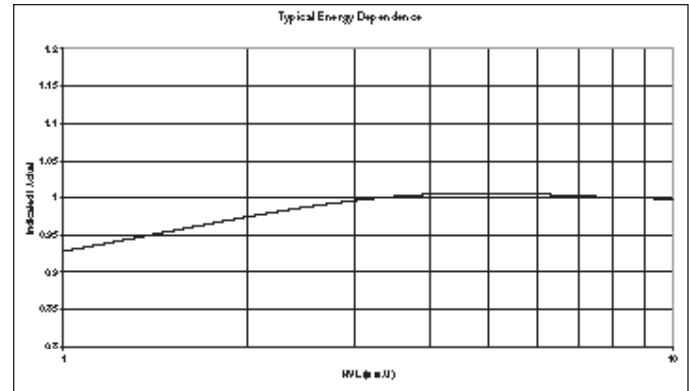
**Response uniformity along axis**  $\pm$  3% over central 90% of active length

**Beam orientation** Normal to chamber axis

**Leakage current** (300 V collection potential) Less than 10<sup>-14</sup> A at 10 min polarization time



## Typical energy dependence for 10 cc high sensitivity ion chamber



**Intensity limits** Continuous beam: 31.6 R/sec, (1% recombination loss)

**Pulsed beam** 15.8 mR/pulse (1% recombination loss)

**Collection time** 0.478 mSec

**Cable length** 3 ft (0.9 m)

**Operating voltage** - 300 V

## Specifications for 3.2 cc

**Detector type** Vented air ion chamber

**Volume** 3.2 cc

**Sensitive length** 10.0 cm

**Chamber material** Polystyrene

**Chamber inside diameter**  
6.4 mm

**Chamber wall thickness**  
54 mg/cm<sup>2</sup>

**Electrode material** Aluminum

**Sensitivity** 10 R•cm/nC (nominal)

**Standard calibration** 100 kVCP, 5.5 mm Al HVL (NIST Tech. M100)

**Response uniformity along axis**  $\pm$  3% over central 90% of active length

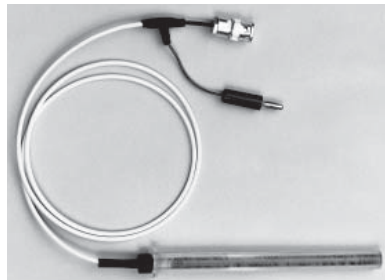
**Beam orientation** Normal to chamber axis

**Phantom adapter OD** 1.27  $\pm$  0.04 cm (0.50  $\pm$  0.015 in)

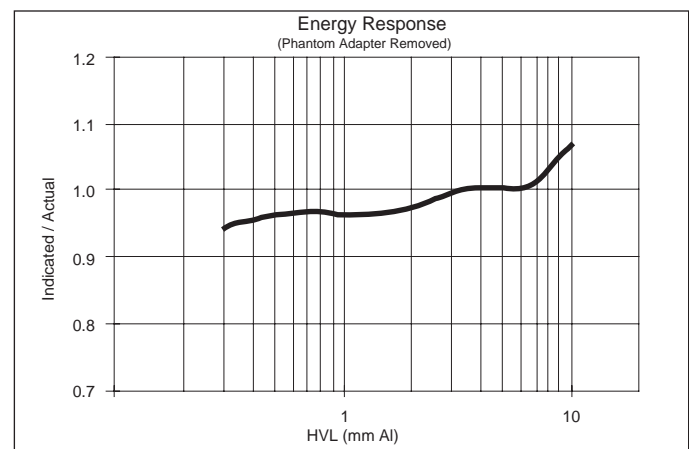
**Leakage current (300 V collection potential)** Less than 1013 A at 10 min polarization time, less than 1014 A at 2 hr polarization time

**Intensity limits** Continuous beam: 4.86 kR/min (1% recombination loss)

**Pulsed beam** 51.5 mR/pulse (1% recombination loss)



## Typical energy dependence for 3.2 cc ion chamber (phantom adapter removed)



**Maximum pulse repetition rate** 3.3 kHz

**Cable length** 3 ft (0.9 m)

**Operating voltage** - 300 V

## Available model(s)

**660-6** CT Ion Chamber, 3.2 cm<sup>3</sup>, with UHF termination: used with Victoreen® Model 660 Electrometer

**500-100** CT Ion Chamber, 3.2 cm<sup>3</sup>, with triax BNC: used with Model 35040 (ATD), TRIAD™ and TRIAD™ TnT

**500-200** CT Ion Chamber High Sensitivity, 10 cm<sup>3</sup> for multislice CT, with triax BNC: used with Model 35040 ATD and other electrometer/dosimeters, including TRIAD and TRIAD TnT

**6000-100** CT Ion Chamber, 3.2 cm<sup>3</sup>, with coax BNC for signal & banana plug for bias: used with Victoreen Models 4000, 6000, 8000 and RAD-CHECK® PLUS

**6000-200** CT Ion Chamber High Sensitivity, 10 cm<sup>3</sup>, for multislice CT, with coax BNC for signal & banana plug for bias: used with Victoreen Models 4000, 6000, 8000 and RAD-CHECK PLUS

For more information or to receive our full product catalog, contact Fluke Biomedical at 440.248.9300 or [www.flukebiomedical.com/rms](http://www.flukebiomedical.com/rms).

*Specifications are subject to change without notice.*

©2005 Fluke Biomedical. All rights reserved. Victoreen, TRIAD and RAD-CHECK are trademarks of Fluke Corporation. Printed in USA.  
76-424-4156-ds rev 3 30 jan 06