

# 10 cc Ion Chamber Description

Model: 7047

## Application

The 10 cc Ionization Chamber is designed as a high activity, bakeable radiation detector. With the small footprint and VCR8 connections the chamber is easily incorporated into any process. The specialized ceramic feed through allows a bias of up to 100V and an anode signal as low as 1 fA (corresponds to 100  $\mu\text{Ci}/\text{m}^3$  of tritium). When combined with Tyne's preamplifier and controller package or signal processor this makes an ideal tool for measuring tritium gas in any process.

*Note:* For lower tritium concentrations, please see Tyne's 1000cc ion chamber.

## Features

- 10cc ion chamber suitable for  $\text{mCi}/\text{m}^3$  to  $\text{kCi}/\text{m}^3$  of Tritium
- Virtual Wall for minimum tritium surface contamination
- Can be used in explosive environment with purge equipment
- Precise, tested and proven 10cc geometry.
- Can bias anode up to 100V from ground
- Inlet precipitator
- Bakeable to cleanse contaminated surfaces from ionization chamber
- Use in a process line or for room air measurements
- Full vacuum to 150 psig
- Flows up to 1 l/s



The 10 cc Ion Chamber is designed to be an in-line radiation in a process gas detector with the most typical application being Tritium. The smaller volume from the 1000cc detector and the virtual wall technology makes this the ideal choice for very high activity measurements. The inlet and outlet VCR 8 connectors allow the chamber to be easily mounted into an existing process line. The internal anode is connected to a floating BNC which can be biased up to 100 V. The high resistance ceramic of the feed through allows the ionization chamber to measure ionization currents as low as 1 fA (1  $\mu\text{Ci}/\text{m}^3$  of Tritium). The bias voltage is also connected to an inlet precipitator to remove any ionized particles carried into the chamber. The maximum inlet flow rate of 1 L/s ensures that all particles are neutralized before entering the chamber. The ionization chamber is an approved pressure vessel that can handle up to 150 psig, is bakeable up to 350°C and is  $1 \times 10^{-9}$  Helium leak tight.

The ionization chamber is typically connected to the Tyne Engineering preamplifier or signal processor. The preamplifier is a multi-ranged amplifier that connects to a remote controller which gives the user the maximum flexibility for measuring the amount of tritium, auto zeroing and alarm functions. The signal processor is a low cost device that provides the bias and converts the 1 fA signal to an easily handled 0 – 10 V signal that can be integrated into any existing data acquisition system.

## Specifications

Volume	10 cc
Measurement Type	Measure ions with a biased Anode
Detection volume Type	Virtual Wall – low activity hang up
Maximum Bias	100 VDC
Minimum Measurable Current	1 fA (equivalent to 0.1 $\text{mCi}/\text{m}^3$ of Tritium)
External Gamma source Signal	5 fA per 1 mR/h
Carry over Protection	Virtual wall precipitator
Flow rate	1 L/s
Pressure	Vacuum to 150 psig
Temperature	350 °C
Leak Tightness	$1 \times 10^{-8}$ cc/sec
Relative Humidity	95 %
Interior	Electro polished
Wetted Parts	316L Stainless Steel, High Density Ceramic
QA	ISO 9001:2000