

## Quadrupole Mass Filters

Extrel makes a wide range of high precision Tri-filter Quadrupole Mass Filters for a variety of applications. They are designed for the highest signal transmission to provide unparalleled Sensitivity, Resolution, and Abundance Sensitivity.

The mass filters are built with stainless rods and Alumina ceramic yokes. The Quadrupoles are UHV compatible and are rugged enough to be baked to 300° C. They can withstand repeated cleanings without any permanent changes to their operating characteristics.

The Tri-filter Mass Filters have RF Pre- and Post-filters to increase Ion Transmission and improve Abundance Sensitivity.

Extrel single Quadrupole Mass Filters can be purchased with or without stainless steel housing. Solid housings are standard but if additional pumping around the Mass Filter is required, heavily vented and partially vented housings are also available. Tri-filter Quadrupole Mass Filters purchased with housings includes Entrance and Exit Lenses. The Entrance and Exit Lenses aid in the transmission of the ions through the RF and DC fringing fields and in improving Abundance Sensitivity.

Mass Range, Sensitivity, Abundance Sensitivity, Resolution, and Transmission are determined by the quadrupole rod size and the RF operating frequency.

The information in Table 1 and Table 2 should be used as a guide for choosing the mass filter for your application.



**Figure 1: 9.5 mm Quadrupole Mass Filter with Vented Housing shown without Entrance and Exit Lenses**

**Table 1: Quadrupole Mass Filter Selection Chart**

Quadrupole Mass Filter	Operating Frequency	Mass Range	Relative Transmission	Resolution (M/ΔM FWHM)	General Sensitivity (mA/Torr)
9.5 mm (3/8 inch) Tri	440 kHz	20-16000	15%	1000	0.075
6 mm (1/4 inch) Tri	880 kHz	25-9000	4%	500	NA
9.5 mm (3/8 inch) Tri	880 kHz	10-4000	20%	1200	0.1
19 mm (3/4 inch) Tri	440 kHz	4-4000	50%	1500	0.75
9.5 mm (3/8inch) Tri	1.2 MHz	2-2000	25%	1500	0.3
9.5 mm (3/8inch) Tri	1.2 MHz	2-1200	25%	1500	0.3
19 mm (3/4 inch) Tri	880 KHz	1-1000	50%	1800	1
19 mm (3/4 inch) Tri	1.2 MHz	1-500	60%	2000	2
9.5 mm (3/8 inch) Tri	2.1 MHz	1-500	30%	2000	0.4
19 mm (3/4 inch) Tri	1.2 MHz	1-300	60%	2000	2
19 mm (3/4 inch) Tri	2.1 MHz	1-120	65%	2500	3
19 mm (3/4 inch) Tri	2.9 MHz	1-60	75%	3000	4

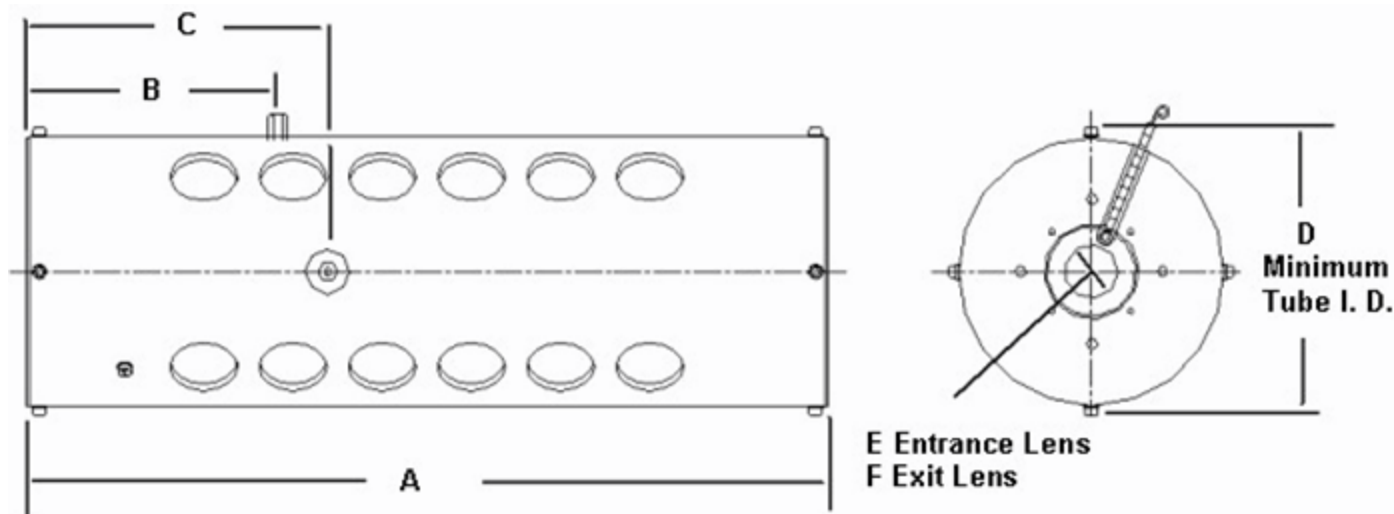


Figure 2: Quadrupole Mass Filter Dimensions

Table 2: Quadrupole Dimensions						
Device	A	B RF	C Posts	D	E	F
6 mm Quadrupole Rods and Collars without Housing or Lenses	200.02	37.12	52.22	54	N/A	N/A
6 mm Quadrupole with Housing	219	47.75	62.73	101	5.08	5.08
9.5 mm Quadrupole Rods and Collars without Housing or Lenses	200.07	78.61	93.85	54	N/A	N/A
9.5 mm Quadrupole with Housing	219	77.21	92.45	101	7.62	7.62
19 mm Quadrupole Rods and Collars without Housing or Lenses	210	62.73	76.96	63.5	N/A	N/A
19mm Quadrupole with Housing	228	72.13	86.36	101	15.24	15.24

Table 3: Quadrupole Options		
Component	Standard	Options
Housing	Non-vented	No Housing (Also eliminates the Entrance and exit Lenses)
		Vented for additional pumping
		Heavily Vented for Maximum Pumping
		Partially vented for insertion through a Top Hat Chamber
		Sealed with Gas Inlet Ports for Collision Cell
Entrance and Exit Lenses	Standard open	None
		Conductance Limited to minimize gas flow
		Special orifice sizes to increase or decrease gas flow or beam size
Mounting and Support Options	Mounted to Grounded Multiplier Housing, No Centering Posts	Tube Lenses
		Mounted to Multiplier Housing, Electrically Isolated
		Grounded Centering Posts
		Isolated Centering Posts
		Custom Mounting

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The Extrel CMS Tri-Filter Quadrupole Mass Filter is a high precision device designed to provide the highest possible Ion Transmission with the best possible Abundance Sensitivity. This combination makes the Extrel CMS Tri-filter Quadrupole the ideal choice for applications requiring the highest Resolution and Sensitivity.

Figure 3 below shows the main components of an Extrel CMS Tri-filter Quadrupole Mass Filter. In

addition to the high precision main quadrupole rods, the mass filter also has Pre- and Post-filters. These are short stub rods before and after the main rods that helps to collimate the ions coming into and exiting the main rods to improve Abundance Sensitivity. The Pre- and Post-Filters also increase the Ion Transmission through the Mass Filter by shielding the ions from the RF and DC fringing fields present at the end of the main rods.

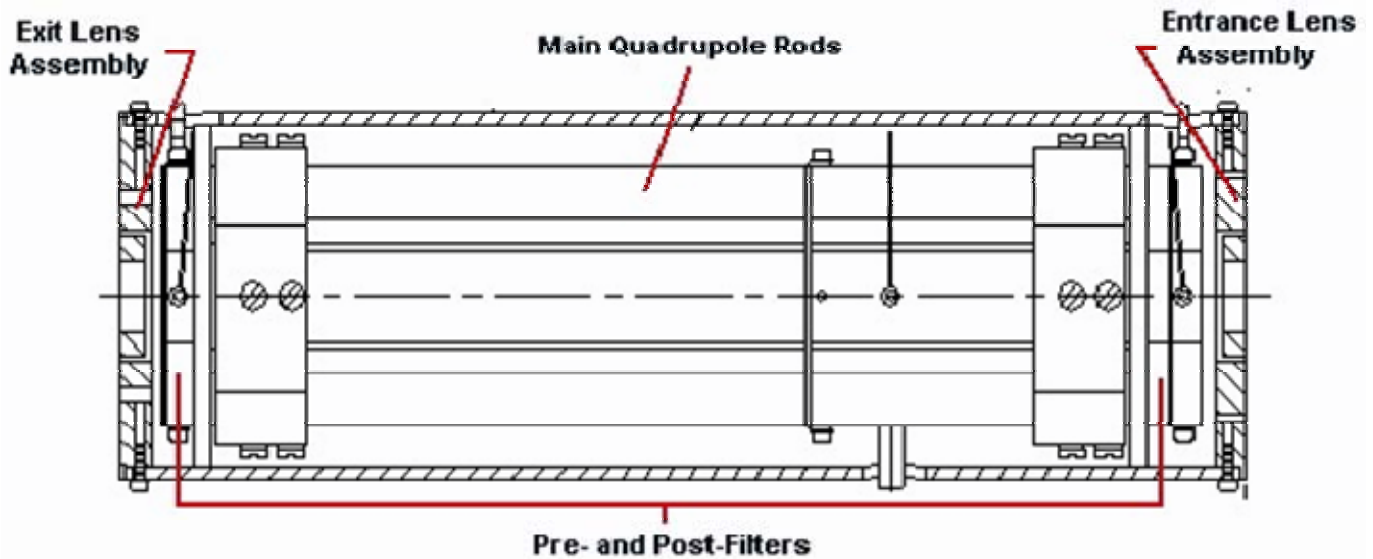


Figure 3: Tri-filter Quadrupole Mass Filter Details

If you would like more information on Extrel's line of Quadrupole Mass Filters or other Mass Spectrometry Components and Systems contact your local Sales Representative.

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