

A Low-Cost Range of Gas Cells for Routine Analysis at Ambient conditions



The Tornado™ series of fixed, long pathlength gas cells is the latest development in low-cost, high performance cells designed for measuring the infrared spectra of gases and vapors at ambient temperatures and pressures.

Manufactured from the finest materials and built to exacting tolerances, they are the ideal choice for the discerning analyst who demands superior performance and value for money. The Tornado™ series is the ideal choice for analysts requiring a fixed, long pathlength gas cell for routine applications. Based on the White cell principle of multiple light passes between an arrangement of reflecting mirrors, Tornado™ series is available in three sizes:

- Tornado™ T5 Fixed at pathlengths from 1m to 8m (1m step)
- Tornado™ T10 Fixed at pathlengths from 2,1m to 10,6m (1,06m step)
- Tornado™ T20 Fixed pathlengths from 2m to 20m. (2m step)

Tornado™ series gas cells are suitable for operation in all modern FT-IR spectrometers using the Specac Bench-mark™ baseplate provided as standard.

Borosilicate glass body material and anodised aluminium/stainless steel internal and external components provide superior corrosion resistance against a wide range of gases and vapors.

Viton® 'O' rings ensure leak-free performance under vacuum and ambient pressures. State-of-the-art optical design combined with gold mirrors ensures the highest possible light throughput giving superior analytical sensitivity.

The supreme, in-built flexibility of the Tornado™ series allows additional mirror carriages to be used in the same body shell, maximising analytical capability and minimising operational costs.

A choice of KBr, ZnSe or CaF₂ window materials allows users to make the optimum window choice for their applications, and the transfer optics box is equipped with purge ports to allow operation under inert atmospheres.

A range of optional features further enhances the flexibility of the Tornado™ range.

Standard Features

- Wide pathlength range (1m - 20m)
- Vacuum to 15 p.s.i. operation
- Ambient temperature operation
- Borosilicate glass body
- Anodised components
- Gold mirrors (protected)
- Viton® 'O' ring seals
- KBr, ZnSe or CaF₂ windows
- Purgeable transfer optics box
- Bench-mark™ series baseplate mounting

Tornado™ Overview of Specifications

Tornado™ T5

Pathlength (fixed):	1m - 8m
Pathlength steps:	1m
Volume:	1.33 liters
Cell body material:	Borosilicate glass
Pressure range:	Vacuum to 15 p.s.i.
Temperature range:	Ambient
Mirrors:	Gold (protected)
Windows:	KBr, ZnSe or CaF ₂
Inlet/outlet tubing:	1/4"
'O' rings:	Viton®
Internal components:	Anodised aluminium & stainless steel
Transfer optics:	Aluminium mirrors in purgeable optics box
Cell mount:	Benchmark™ series baseplate
Dimensions (mm):	H455 W153 D130



Tornado™ T10

Pathlength (fixed):	2.1m - 10.6m
Pathlength steps:	1.06m
Volume:	2.6 liters
Cell body material:	Borosilicate glass
Pressure range:	Vacuum to 15 p.s.i.
Temperature range:	Ambient
Mirrors:	Gold (protected)
Windows:	KBr, ZnSe or CaF ₂
Inlet/outlet tubing:	1/4"
'O' rings:	Viton®
Internal components:	Anodised aluminium & stainless steel
Transfer optics:	Aluminium mirrors in purgeable optics box
Cell mount:	Benchmark™ series baseplate
Dimensions (mm):	H470 W153 D146



Tornado™ T20

Pathlength (fixed):	2m - 20m
Pathlength steps:	2m
Volume:	4.7 liters
Cell body material:	Borosilicate glass
Pressure range:	Vacuum to 15 p.s.i.
Temperature range:	Ambient
Mirrors:	Gold (protected)
Windows:	KBr, ZnSe or CaF ₂
Inlet/outlet tubing:	1/4"
'O' rings:	Viton®
Internal components:	Anodised aluminium & stainless steel
Transfer optics:	Aluminium mirrors in purgeable optics box
Cell mount:	Benchmark™ series baseplate
Dimensions (mm):	H675 W153 D146

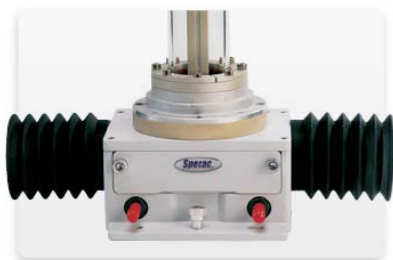


Tornado™ Series Options

Tornado™ series long pathlength gas cells have been designed with the serious analyst in mind. These high performance, superior quality cells are backed by a range of optional upgrades to further enhance their performance.

Purge Bellows

A pair of purge bellows is available for the Tornado™ series gas cells. These fit between the optics box of the cell and the spectrometer to allow the purging of transfer optics with inert gases such as nitrogen.



This feature allows absorbances due to atmospheric H₂O and CO₂ to be eliminated from spectral measurements.

These bellows are designed to fit all Bench-mark™ sampling accessories.

Desiccant Storage Caps

These caps are designed to fit over the optical inlet and outlet ports of the Tornado™ series gas cells to seal the transfer optics when the cells are not in use. One of the caps contains a desiccant material which maintains a dry atmosphere within the transfer optics box and extends the life of KBr windows.



Mirror Carriage Assembly

Additional mirror carriages can be specified for use within a single Tornado™ body. This feature greatly enhances the analytical flexibility of the series, and significantly reduces operating costs.



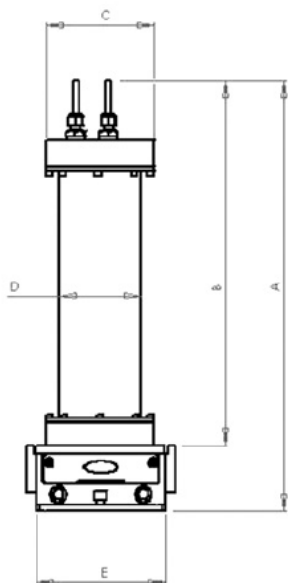
Pressure Gauge Kit

A pressure gauge kit is available to fit the Tornado™ series gas cells.

Gauges is designed for low pressure operation (vacuum to 15 p.s.i.) and an integral pressure relief valve ensures that cells are automatically depressurised in the event of accidental over pressurisation.



Tornado™ Series - Key Dimensions

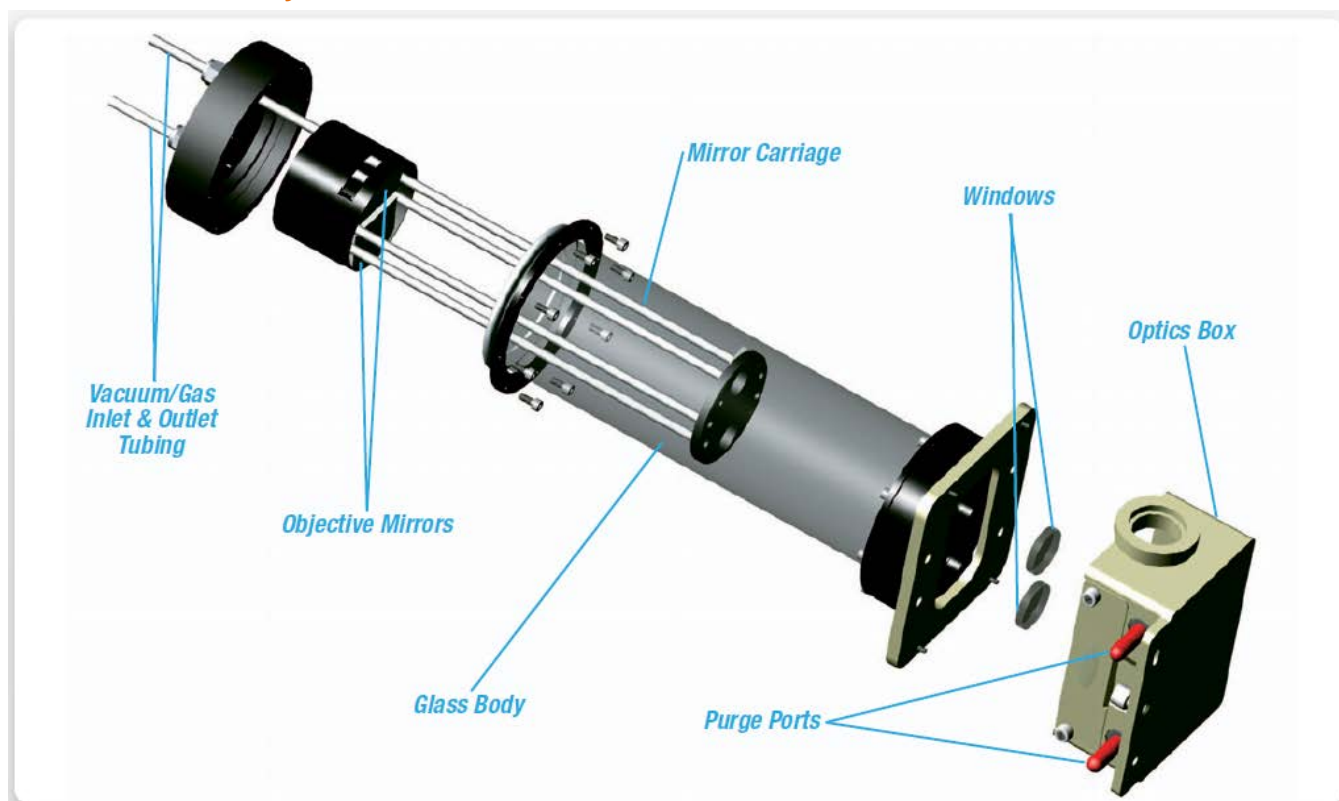


Cell	Base Pathlength	Pathlength Range	Volume
T5	25 cm	1m to 8m (in 1m steps)	1.33 liters
T10	26.4 cm	2.1m to 10.6m (in 1.06m steps)	2.6 liters
T20	50 cm	2m to 20m (in 2m steps)	4.7 liters

Cell	A	B	C	D	E
T5	455	385	114	86	153
T10	470	400	143	113	153
T20	675	606	143	113	153

All dimensions in mm

Tornado™ Assembly



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