Tornado® Gas Cells

A low-cost range of gas cells for routine analysis at ambient conditions

Tornado Gas Cells

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** Pathlengths ranging from 1m to 8m in 1m steps
- **Tornado® T10** Pathlengths ranging from 2.1m to 10.6m in 1.06m steps
- **Tornado® T20** Pathlengths ranging from 2m to 20m in 2m steps

Tornado® series gas cells are suitable for operation in all modern FT-IR spectrometers using the Specac Benchmark® 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 as standard.

There is an option to configure the Tornado cell with a nickel coated aluminium body in place of the borosilicate glass for pressure up to 125 psi. 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.

Standard features

- Wide pathlength range (1m - 20m)
- Vacuum to 15 psi 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
- Benchmark® series baseplate mounting

Optional features

- Additional mirror carriage assemblies
- Vacuum/gas inlet & outlet taps
- Pressure gauge
- Desiccant storage caps
- Purge bellows

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.

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Tornado® T5

- Pathlength (fixed): 1m - 8m
- Pathlength steps: 1m
- Volume: 1.33 litres
- Dimensions (mm): H455 W153 D130

Tornado® T10

- Pathlength (fixed): 2.1m - 10.6m
- Pathlength steps: 1.06m
- Volume: 2.6 litres
- Dimensions (mm): H470 W153 D146

General specifications

- Cell body material: Borosilicate glass
- Pressure range: Vacuum to 15 psi
- Temperature range: Ambient
- Mirrors: Gold (protected)
- Windows: KBr, ZnSe or CaF2
- 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

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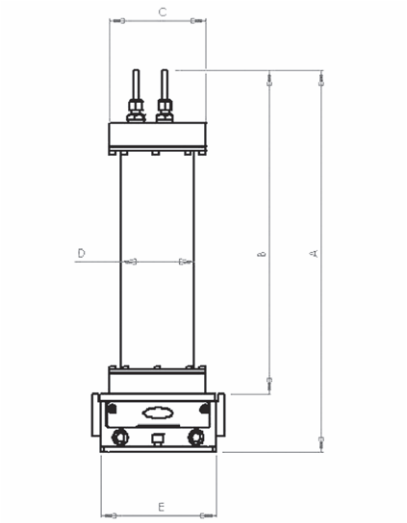
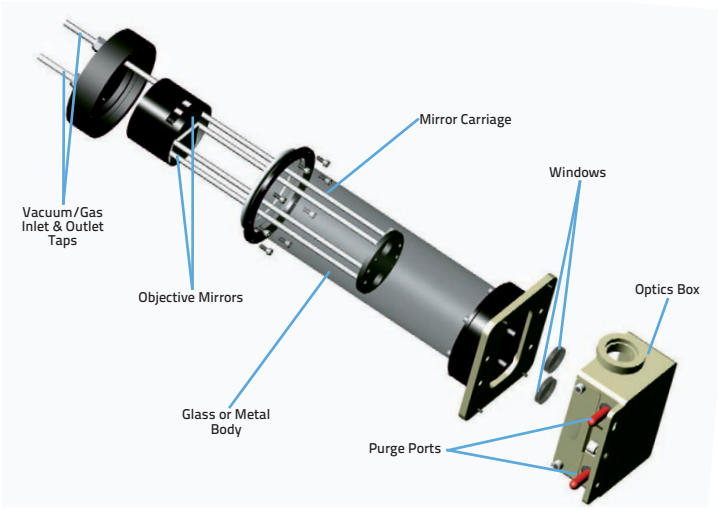
Heatable long pathlength Gas Cells

Tornado® T20

- Pathlength (fixed): 2m - 20m
- Pathlength steps: 2m
- Volume: 4.7 litres
- Dimensions (mm): H675 W153 D146





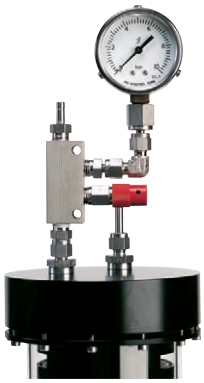
Cell	A	B	C	D	E
T5	455	385	114	86	153
T10	470	400	143	113	153
T20	675	606	143	113	153

All dimensions in mm

Cell	Base Pathlength	Pathlength Range	Volume
T5	25cm	1m to 8m (in 1m steps)	1.33 litres
T10	26.4cm	2.1m to 10.6m (in 1.06m steps)	2.6 litres
T20	0.5cm	2m to 20m (in 2m steps)	4.7 litres

Tornado® Gas Cells

Optional features



Optional features

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 H_2O and CO_2 to be eliminated from spectral measurements.

GS10707 Purge Bellows (pair)

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.

GS24150 Desiccant Storage Caps

Pressure Gauge Kit

A pressure gauge kit is available to fit the Tornado® series gas cells. Gauges can be specified for low pressure operation (vacuum to 15 psi) and high pressure operation (vacuum to 125 psi - metal bodied cell only). An integral pressure relief valve ensures that cells are automatically depressurised in the event of accidental over pressurisation.

Specac recommend the use of a pressure gauge when operating gas cells at elevated pressures.

GS24160 Pressure Gauge Kit (pair)
(Specify high or low pressure)

Tornado® Gas Cells compatibility chart

This guide shows which Tornado® gas cell type can be used within a range of spectrometer sample compartments.

Key: **F** - Fits **DNF** - Does Not Fit

FT-IR Instrument	T5 Cell P/N GS24205	T10 Cell P/N GS24210	T20 Cell P/N GS24220
Bomem M100	F	F	F
Bomem MB100	F	F	F
Bruker IFS66	F	F	F
Bruker Tensor, Vertex, Vector Instruments	F	F	F
Agilent Instruments	F	F	F
Mattson Genesis	F	F	F
Mattson Galaxy	F	F	F
Midac	F	F	F
Nicolet 500, Avatar, Nexus, iS10 Instruments	F	F	F
Nicolet iS5	F	F	F
Perkin Elmer 2000 (GX)	F	F	F
Perkin Elmer Spectrum One, 100, 400, Frontier Instruments	F	F	F
Perkin Elmer Spectrum Two	F	DNF	DNF
Jasco 400/600V, 5000/7000 instruments	F	F	F
Shimadzu 8400, Prestige 21, IRAffinity Instruments	F	F	F

Note: If your spectrometer is not listed , please contact Specac for further details

Tornado® Gas Cells

Optional features

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.

GS24252 **Mirror Carriage Assembly**
(specify model and pathlength)

ordering information

GS24205 **Tornado® T5**
1m - 8m Long Pathlength Gas Cell

GS24210 **Tornado® T10**
2.1m - 10.6m Long Pathlength Gas Cell

GS24220 **Tornado® T20**
2m - 20m Long Pathlength Gas Cell

Fixed pathlengths available

Tornado® T5 - 1, 2, 3, 4, 5, 6, 7, 8m
Tornado® T10 - 2.1, 3.2, 4.2, 5.3, 6.3, 7.4, 8.5, 9.5 &10.6m
Tornado® T20 - 2, 4, 6, 8, 10, 12, 14, 16, 18 & 20m

Tornado gas cell configuration step by step

1) Choose the size of gas cell with its part number eg for Tornado T5 cell the P/N would be GS24205
2) Choose body type from Glass (G) or Metal (M)
3) Choose the window material from KBr (K), CaF2 (C) or ZnSe (Z).
4) Specify a fixed pathlength from those available for the cell size
5) If required choose a Low (L) or High (H) pressure gauge kit to be fitted

Example: P/N GS24205GCFV would be for a Cyclone C5 cell with a glass body, CaF2 windows, fixed pathlength, Viton O-rings and no pressure gauge

For all Gas Cells please specify Spectrometer make and model to include provision of the appropriate Benchmark® baseplate for installation

(Please note: KBr windows cannot be used with a metal bodied cell)

Options

GS10707 **Purge Bellows** (pair)
GS24150 **Desiccant Storage Caps**
GS24152 **Mirror Carriage Assembly** for Tornado® series gas cells
(specify model & pathlength)

GS24160 **Pressure Gauge Kit**
To fit Cyclone® and Tornado® gas cells
(specify model & high or low pressure)

GS24161 **Vacuum/Gas Inlet & Outlet Taps**
with push-on connectors for Tornado® series gas cells

GS24206 **Tornado Gas Cell T5 ESK**
GS24207 **Tornado Gas Cell T10, T20 ESK**

Replacement windows

GS24153 **Replacement KBr windows**
for Tornado® and Cyclone® series gas cells
(specify model)

GS24154 **Replacement ZnSe windows**
for Tornado® and Cyclone® series gas cells
(specify model)

GS24155 **Replacement CaF2 windows**
for Tornado® and Cyclone® series gas cells
(specify model)