

## Golden Gate™ - Single Reflection Diamond ATR

The Golden Gate™ is the world's most versatile Infrared sampling system.

It analyzes all sample types from hard solids to corrosive liquids and is fast, sensitive and robust.



Outstanding sensitivity is achieved using high pressure contact against a solid, type IIIa diamond, selected for its unparalleled sensitivity as a single reflection ATR element together with its unique physical and chemical stability.

The accessory can be used to analyze a range of samples from single particles and fibers to corrosive liquids.

While the large working area sample platform is ideal for macro sampling.

The diamond is high temperature bonded into its tungsten carbide mount, giving performance and strength to withstand the high pressures required for maximum optical contact with hard samples.

The quick lock and release bridge allows for fast sample change around.

The built-in pressure control mechanism means reproducible results are obtainable and optimum sample clamping is achieved.

### Product Highlights

- High sample throughput - no sample preparation
- Rugged type IIIa diamond ATR metal-bonded into a tungsten carbide mount
- Hard, inert, sapphire self-levelling pressure anvil
- Pressure bridge for highest sensitivity
- A wide choice of available options
- Quick release bridge with safety interlock
- Built-in pressure control for reproducible results

### Applications

- QA on pharmaceutical powders
- Analysis of hard and soft polymer pellets
- Forensic sampling, paint chips and single fibers
- Hard samples, e.g. rock and geochemicals
- Corrosive liquids
- Coated wires
- Air sensitive samples

• Illustrations, descriptions and specifications in this data sheet were correct at the time of going to press. However, Specac's policy is one of continuous product development and we reserve the right to change descriptions and specifications at any time. For the latest details please contact your local Specac office or representative.

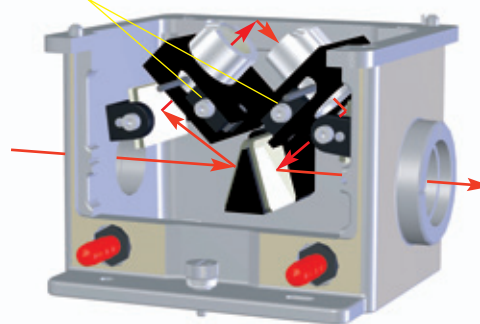
# The Golden Gate™ - Single Reflection Diamond ATR Series MkII

## Schematic of the Golden Gate™ Single Reflection ATR System

The Top-plates of the Golden Gate™ Single Reflection ATR Series are supplied on an optical unit which contains mirrors and a choice of beam condensing optics (ZnSe or KRS-5). All Top-plates are interchangeable with the optical unit.

A schematic is shown opposite of the beam path through the Golden Gate™ optical system. The symmetrical design coupled with the use of the Benchmark™ base-plate system means that the Golden Gate™ can be used in most commercially available FTIR instruments.

Beam Condensing Lenses



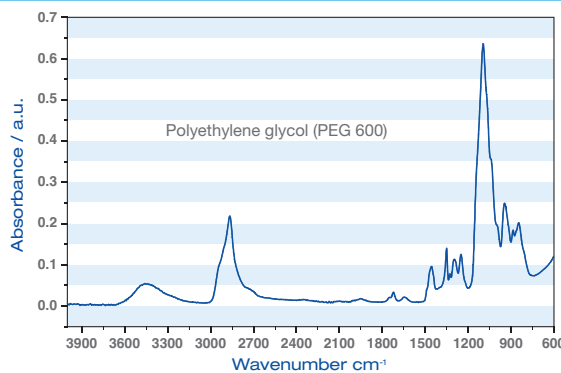
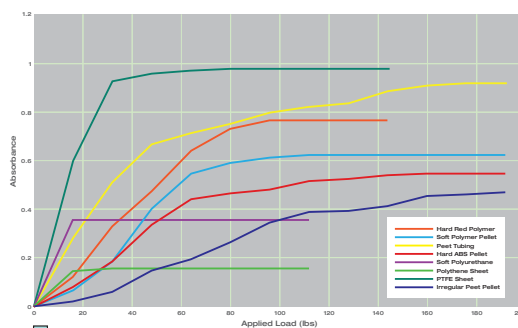
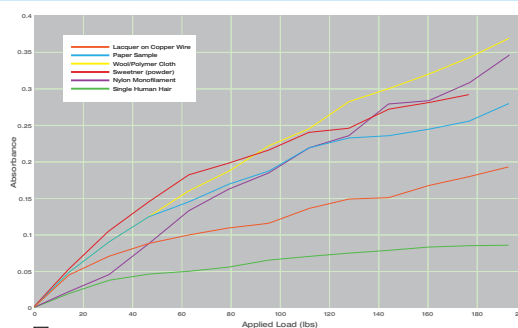
## Reproducibility and Sensitivity of the Golden Gate™ Single Reflection ATR System

A key feature of the Golden Gate™ Single Reflection ATR System is the outstanding contact achievable with solid samples to the diamond crystal.

As the load is increased via the bridge clamping mechanism and optical contact between the diamond and the sample increases, there is a critical load at which the optimum optical contact is achieved. Thereafter, no increase in absorbance intensity is possible and maximum sensitivity of the measurement is achieved.

With accessories capable of applying only small loads there is uncertainty as to whether the maximum optical contact has been achieved. Therefore, sensitivity for the technique is also compromised. In addition, until optimum contact is achieved, there is no control over experimental reproducibility.

Low load measuring devices on low load ATR units are not sensitive to changes in the sample properties under applied load. The unique high load capability of the Golden Gate™ Diamond ATR ensures that maximum sensitivity is achieved reproducibly.



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## Germanium Top-plate



Traditionally difficult samples, such as those containing high concentrations of carbon black, require controlled penetration of the infrared beam. The high refractive index of germanium makes this ATR material an ideal choice for these samples. Optimum sensitivity is achieved using a 4mm x 4mm germanium crystal cemented into a rugged stainless steel disc for maximum strength and support.

The shallow depth of penetration with no band distortion overcomes difficult quantitative analysis of strongly infrared absorbing materials. Similarly, corrosive samples, thin films and surface coatings can also be analyzed.

### Features

- 45° single reflection germanium crystal
- 4mm x 4mm cement bonded stainless steel mount
- Working range 5000-550cm<sup>-1</sup>
- Pressures up to 2 kbar
- High throughput
- Good chemical resistance
- Suitable for use with DTGS detectors
- Full compatibility with Golden Gate ATR series

### Applications

- Very strongly absorbing polymers and rubbers
- Thin films on semi-conductors and other substrates
- Surface coatings
- Corrosive liquids
- Macro and micro sample volumes
- Forensic Science

## Anvil Options

A variety of special anvils are available for use with the Golden Gate™ Top-plates. The use of an appropriate anvil improves the sample handling capabilities of the Golden Gate™ Single Reflection ATR System.

### 1 Reactive Sample Anvil

Samples which are sensitive to air or moisture can be loaded and pressed in a dry box. The anvil has a seal which compresses as the sample is pressed, thus keeping it in an inert environment while the spectrum is being run.

### 2 & 5 Grooved Anvils (Narrow and Wide)

To study the coating on transformer wire the grooved anvils hold the wire exactly in the middle of the diamond.

### 3 Sapphire Anvil

This is the standard anvil and is used for most sample types. It has the advantage of being very hard, and easy to clean to prevent sample carry-over. It is also self-levelling to accommodate non-flat samples.

### 4 Stainless Steel Flat Anvil

This is used for fibers or fine wires. It is not self-levelling, which can be an advantage with this type of sample.

### 6 Pellet Anvil

Polymer pellets are held firmly in position with this concave anvil. With a flat anvil they could move when pressure is applied.

### 7 Volatiles Cover

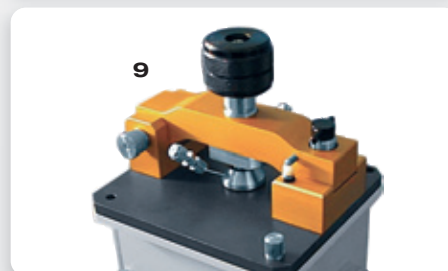
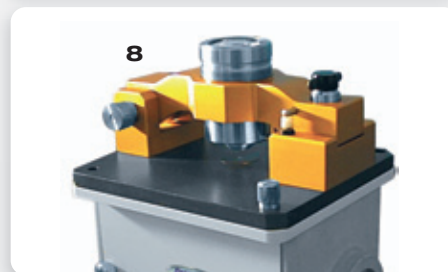
If liquid samples are very volatile the cover is useful to minimize evaporation.

### 8 View-Thru Anvil

The View-Thru Anvil allows the sample to be viewed through a 4x lens system with a built-in reflective illuminator.

### 9 Flow-Thru Anvil

This micro flow cell anvil seals under pressure around the diamond. Its volume is 28 microliters and it can operate at 1000 psi. It may be used as a flow cell or as a micro reaction chamber.



# The Golden Gate™ - Single Reflection Diamond ATR Series MkII

## Ordering information

### Golden Gate™ ATR Mk II Series

A Complete Golden Gate™ ATR Mk II System consists of an Optics Unit with Lenses, Top-plate, Baseplate and Purge Bellows.

### GS10500 Golden Gate™ ATR Mk II

When ordering specify 10500 Series Golden Gate™ ATR Mk II and choose from the following Top-plates. Also specify Spectrometer make and model for the appropriate Baseplate.

GS10563	Diamond ATR Top-plate Mk II
<i>Includes:</i>	Sapphire and Pellet anvils, volatiles cover
GS10566	Germanium ATR Top-plate Mk II
<i>Includes:</i>	Large stainless steel anvil and volatiles cover
GS10565	Wire Holder Diamond ATR Top-plate Mk II
<i>Includes:</i>	Narrow and wide gauge grooved anvils and stainless steel flat anvil
GS10514	Micro Specular Reflectance Top-plate
<i>Includes:</i>	Reference mirror

*All of the Top-plates can be ordered separately as upgrades if desired.*

### GS10542 Heatable Golden Gate™ ATR Mk II

A Complete Heatable Golden Gate™ ATR Mk II System consists of an Optics Unit with Lenses, Heatable Diamond ATR Top-plate MkII, Baseplate, Purge Bellows and an Automatic Temperature Controller (please state if communication is required, options are RS232, RS485 or USB) The Heatable Diamond ATR Top-plate includes Sapphire and Pellet Anvils, and Volatiles Cover.

When ordering specify GS10542 Series Heatable Golden Gate™ ATR and Spectrometer make and model for the appropriate Baseplate. Also specify 220V or 110V and country for controller.

Choose from the following Lens Configurations:

- ZnSe Lenses 5000 - 650cm-1
- KRS5 Lenses 5000 - 300cm-1 Golden Gate™ Reaction Cell

### GS10540 Heated Diamond ATR Top-plate Mk II Upgrade

This is for ordering a Heated Diamond ATR Top-plate and controller (please state if communication is required, options are RS232, RS485 or USB) as an upgrade for an existing Golden Gate™ System.

The Heatable Diamond ATR Top-plate Mk II includes Sapphire and Pellet Anvils, and Volatiles Cover.

When ordering specify GS10540

Series Heated Diamond ATR Top-plate Mk II and 220V or 110V and country for controller.

### Golden Gate™ Reaction Cell

This version of the Golden Gate™ ATR Mk II System is available in a number of configurations - contact your Product Specialist to discuss your requirements.

### Upgrade - Lenses

GS10552	ZnSe lens upgrade kit 5000 - 650cm-1
GS10508	KRS-5 lens upgrade kit 5000 - 300cm-1

### Anvil Options Mk II Golden Gate™

GS10503	Volatiles cover
GS10522	Forensic Sapphire anvil
GS10531	Sapphire anvil
GS10532	Pellet anvil
GS10536	Reactive sample anvil
GS10547	Grooved anvil - narrow gauge
GS10548	Grooved anvil - wide gauge
GS10549	Stainless steel flat anvil
GS10567	Stainless steel large anvil for Germanium Top-plate
GS10568	Micro Reaction/Flow Cell anvil
GS10569	View-Thru Anvil/Bridge assembly

### Spares

GS10707	Purge tubes (bellows) 1 pair
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### Anvil Options MK I (Pre Oct 1999) Golden Gate™ Top-plates (without Quick Lock Bridge)

GS10501	Sapphire anvil
GS10502	Pellet anvil
GS10506	Reactive sample anvil
GS10517	Grooved anvil - narrow gauge
GS10518	Grooved anvil - wide gauge
GS10519	Stainless steel flat anvil
GS10521	Forensic Sapphire anvil
GS10557	Stainless steel large anvil for Germanium Top-plate
GS10558	Micro Reaction/Flow Cell anvil

### Mk I to Mk II Top-plate Upgrade

GS10564 Specac can upgrade an existing Mk I Golden Gate™ Top-plate to a Mk II version with the Quick Lock and release bridge and in-built pressure mechanism. The upgrade includes Sapphire anvil GS10531 and Pellet anvil GS10532. Return your Mk I Top-plate to Specac for the upgrade.

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