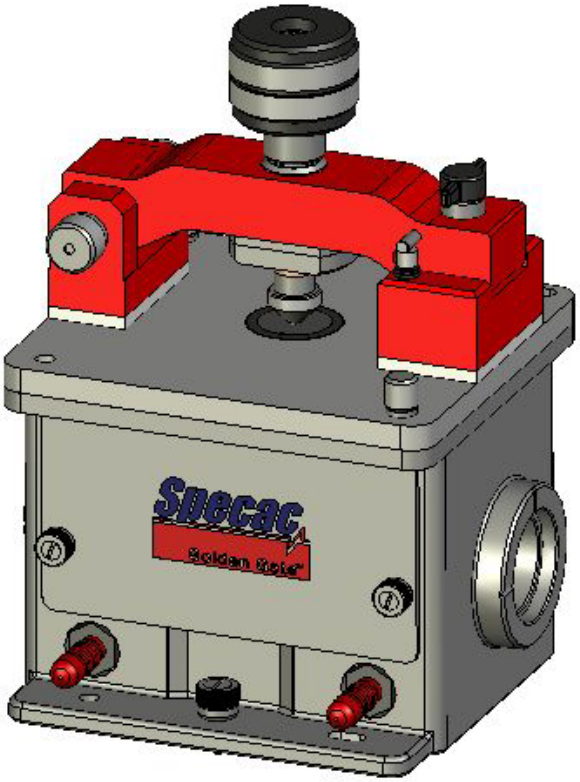
Golden Gate High Temperature Heated Diamond ATR Top Plate



2I-10642 Issue 8

Golden Gate High Temperature Heated Diamond ATR Top Plate

User Manual

2I-10642 Issue 8

Index

1. Introduction

The Golden Gate® with High Temperature Heated Diamond ATR Top Plate (GS10642) is one of a series of top plates which can be used on the optical base assembly of the Golden Gate ATR system. The High Temperature Heated Diamond ATR Top Plate is operable across a temperature range from ambient to 300°C using the temperature controller. See 2l-10640 issue 5 for use with 4000 series controllers.

The diamond ATR crystal, tungsten carbide support puck is sealed around its edge with silicone resin and a black PEEK™ heat insulation ring. Sealing prevents ingress of any liquid samples or volatile solvent vapours passing through to the optical components within the Golden Gate assembly.

This specific instruction manual for the High Temperature Heated Diamond ATR Top Plate is to be used in conjunction with the standard Golden Gate manual (GS10500 Series) supplied with every Golden Gate system and the separate temperature controller manual.

2. Safety Considerations

List of Safety Symbols

This manual should be consulted when any of the Safety Symbols below appear, to understand the nature of the Hazards and any actions to be taken in order to avoid them.

Safety Symbol	Meaning
	General Caution. (Reference ISO 7000-0434B, 2004-01)
	Caution – Hot Surface. Reference IEC 60417-5041, 2002-10)
	Caution – Possibility of Electric Shock
	Indoor Use Only

Warning: Do not use this equipment with any accessory it has not been specifically designed or configured for use with. Contact your local authorized Specac dealer or sales team for further information regarding the compatibility with other devices and 3rd party accessories.

Caution! For indoors use only. Do not subject to dripping or splashing. Not for use in wet locations.

Electrical Safety

Warning: The temperature controllers supplied with the Golden Gate accessory are of Class 1 (earthed) construction and must be connected to an earthed mains socket outlet.

Warning: Disconnect the mains from the temperature controller before cleaning. Clean only with a soft cloth, lightly moistened with water.

General Operational Safety Use

Caution: Always follow local laboratory safety protocols and procedures when using potential toxic or flammable substances with this equipment. The equipment is intended for use by suitably trained personnel only.

Caution: Always wear adequate PPE gloves when handling the housing if they are to be removed or fitted to or from the spectrometer and when cleaning.

Warning: Heating of materials could lead to the liberation of hazardous substances.

Warning: If the heating of materials could lead to the liberation of hazardous substances or gases, explosion or implosion, then an extraction system and/or a temperature limiting device, relating to the materials and safe temperatures for the materials used, should be installed.

Caution: No user serviceable parts within, contact the manufacturer or approved service agent for advice if the product is not functioning correctly or is visibly damaged.

Caution: If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired

Warning: Risk of burns when operated at high temperatures on accessible parts surrounding the puck assembly.

Warning: This equipment heats samples, if your sample is a flammable or combustible liquid, operate only in accordance with approved laboratory procedures.
Do not heat flammable samples above their rated flash point, ensure the quantity of liquid used is limited to an amount they could not cause the spread of fire.
Provide adequate ventilation, remove nearby ignition sources, and confirm that all safety controls (temperature limits, monitoring systems, containment measures) are functioning properly. Use appropriate PPE and never leave the equipment unattended while heating flammable materials.

Warning! Before use it should be confirmed that the sample to be tested in experimentation is compatible with all of the materials listed. **Specac cannot be held responsible for any damage or breakdown of the equipment that may be caused as a result by chemical attack from unsuitable materials. Whenever the equipment is not being used, ensure it has been thoroughly cleaned and dried before storage.**

The Heated Golden Gate Top Plate is constructed from 316 stainless steel with a Tungsten Carbide Disc and PEEK insulation ring and is designed to operate within specified limits of 300°C.
This product has been evaluated to IEC 61010-1: Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use and IEC 61010-2-010: Particular Requirements for Laboratory Equipment for the Heating of Materials.
However, combinations of temperature and chemical substances that may be used in this system have not all been validated for every application. It is the user's responsibility to ensure the suitability of the system for their specific use:

- *Ensure all substances and gases are chemically compatible with each other and the materials used in the product.*
- *Confirm operating conditions fall within the chamber's specified limits*
- *Conduct a thorough hazard evaluation and risk assessment before testing*
- *Review all relevant Safety Data Sheets (SDS)*
- *Adhere to applicable regulatory guidelines (e.g., OSHA, EPA)*
- *Routinely inspect and maintain the accessory for safe use.*

Specac assumes no liability for damage, hazards, or failure resulting from:

- *Use of auxiliary equipment or substances not compatible with this product*
- *Operation outside the defined specifications or test parameters*
- *Improper risk assessment or failure to implement necessary safety precautions*

Warning: Should potentially hazardous or hazardous materials be used or spilled onto or into the equipment the RESPONSIBLE BODY shall ensure that the appropriate decontamination is carried out and that no decontamination or cleaning agents are used which could cause a HAZARD as a result of a reaction with parts of the equipment or with material contained in it, if in any doubt about the compatibility of decontamination or cleaning agents contact Specac Technical Support for further information.

Warning: Any cleaning solvents used should be checked for compatibility with the products materials and any samples used, against commercially available compatibility charts. Risk of chemical reaction leading to release of hazardous substance.

End of Lifetime Equipment Use

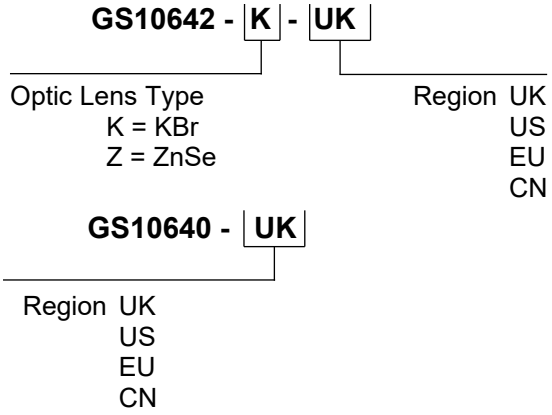
If any parts have reached their limit of lifetime and need to be replaced, use appropriate WEEE and other local regulations for the safe disposal of electrical equipment and toxic chemicals.

3. Specification

The Golden Gate High Temperature Heated Diamond ATR Top Plate is provided with its own dedicated Temperature Controller. A separate manual is supplied for specific operation of the Temperature Controller. This device is designed to use in a controlled laboratory environment only.

Model / Part No.	Description	Weight - Kg	Dimensions (LxWxH mm)
GS10640	Golden Gate High Temperature Heated Diamond ATR Top Plate with Temperature Controller	1.77	123x140x120
GS10642	Golden Gate with High temperature top plate and optical assembly and Temperature Controller	2.53	130x157x203
261-058	USB Temperature Controller	0.14	70x81x32
267-045	USB Desktop power supply (PSU)	0.78	170x58x44
523-075	100-230V 50/60Hz 150W 4000 Series Controller	4.50	410x110x 214

Model number configurations:



Golden Gate High Temperature Heated Diamond ATR Top Plate Specification with Temperature Controller

Temperature range:	Ambient to 300°C maximum.
Thermocouple type:	K Type (Chromel-Alumel).
Heating rate (puck):	6 mins, 20°C to 300°C (≈45°C / min).
Cooling rate:	25°C/min from 300°C.
DC input rating:	30V ⎓ 4.17A
Humidity:	0% to 80% RH, non-condensing.
Operating temperature:	5 to 40°C
Storage temperature:	-20 to 60°C.
Temperature set steps:	0.1°C.
Temperature stability:	±0.1°C in stable environment.
Thermocouple accuracy:	±1.5°C at 300 °C.
Maximum power output:	150 Watts.

Power Supply AC input ratings for USB temperature controller.

Voltage (Vac)	Frequency (Hertz)	Input Current (A)	Short circuit protection
100-240	50-60	2.5 Max	Continuous – hiccup mode (auto recovery)

4000 Series temperature controller AC input ratings.

Voltage (Vac)	Frequency (Hertz)	Input Current	Short circuit protection
110/230V	50/60	3.0/1.5A	Continuous – hiccup mode (auto recovery)
Fuse rating			
250V	-	T1.6AH	EU, UK, CN
250V	-	T3.15AH	US, JAPAN

4. Unpacking and Checklist

On receipt of the equipment please check that the following have been supplied:

- Golden Gate High Temperature Heated Diamond ATR Top Plate
- Golden Gate Optical unit with choice of ZnSe or KRS-5 lenses and appropriate Benchmark baseplate (if GS10642 ordered)
- 4000 Series temperature controller or USB temperature controller with tabletop inline power supply and connecting Cables

Remove the top plate and Golden Gate optics unit from their packing and install the Golden Gate ATR unit into the spectrometer once assembled (see Golden Gate Manual GS10500).

For instructions on heating of the Golden Gate High Temperature Heated Diamond ATR Top-Plate please refer to the specific Temperature Controller Manual. The temperature controller is pre-configured and tuned to the accessory, and so needs no further set up adjustments.

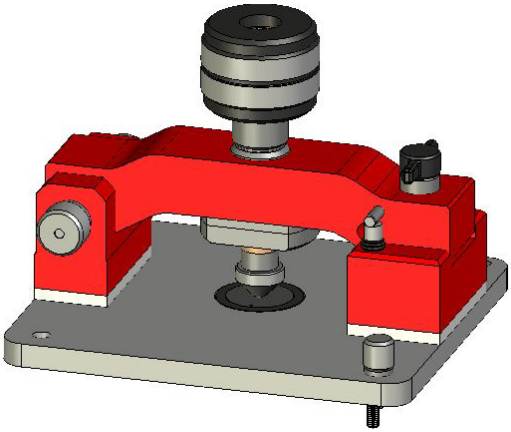


Fig 1. Top View of High Temperature Heated Diamond ATR Top-Plate

5. Operation

It is advisable to operate the Golden Gate High Temperature Heated Diamond accessory in a spectrometer with the sample compartment lid of the spectrometer closed (if possible). This will help with stability of the working temperature.

If the sample compartment lid must be kept open during operation, always wear protective safety spectacles whenever in the vicinity of the accessory.

Note: If the sample compartment volume of the spectrometer is smaller than 200mm x 200mm x 200mm when the lid is closed, then the sample compartment lid must be kept open to prevent activation of the safety thermal protection system. Opening of the compartment lid will allow natural heat convection to prevent the unit from overheating. However, if the sample compartment lid must be kept closed, Specac recommend that a purging gas of N_2 is used through the sample compartment.

Consult the manufacturer or their authorised representative if any doubt.

Load Limitation to Samples at High Temperature

Note: *When pressing solid samples against the diamond using the sapphire anvil P/N GS10531, the load* ***must*** *be applied from the standard torque mechanism knob assembly. (See use of torque limiter screw item 21 described in Golden Gate Manual 10500). If a greater load than standard is applied from the torque wrench and Torx head adapter parts P/N GS10504 and GS10505 respectively, damage will occur to the sapphire tip on the anvil.*

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