

ARES-G2

UV Curing Accessory



Getting Started Guide



Notice

The material contained in this manual, and in the online help for the software used to support this instrument, is believed adequate for the intended use of the instrument. If the instrument or procedures are used for purposes other than those specified herein, confirmation of their suitability must be obtained from TA Instruments. Otherwise, TA Instruments does not guarantee any results and assumes no obligation or liability. TA Instruments also reserves the right to revise this document and to make changes without notice.

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Introduction

Important: TA Instruments Manual Supplement

Please click the [TA Manual Supplement](#) link to access the following important information supplemental to this Getting Started Guide:

- TA Instruments Trademarks
- TA Instruments Patents
- Other Trademarks
- TA Instruments End-User License Agreement
- TA Instruments Offices


Notes, Cautions, and Warnings

This manual uses NOTES, CAUTIONS, and WARNINGS to emphasize important and critical instructions. In the body of the manual these may be found in the shaded box on the outside of the page.

NOTE: A NOTE highlights important information about equipment or procedures.

CAUTION: A CAUTION emphasizes a procedure that may damage equipment or cause loss of data if not followed correctly.

MISE EN GARDE: UNE MISE EN GARDE met l'accent sur une procédure susceptible d'endommager l'équipement ou de causer la perte des données si elle n'est pas correctement suivie.

	<p>A WARNING indicates a procedure that may be hazardous to the operator or to the environment if not followed correctly.</p> <p>Un AVERTISSEMENT indique une procédure qui peut être dangereuse pour l'opérateur ou l'environnement si elle n'est pas correctement suivie.</p>
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Regulatory Compliance

Safety Standards

For Canada

CAN/CSA-C22.2 No. 61010-1 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General Requirements.

CAN/CSA-C22.2 No. 61010-2-010 Particular requirements for laboratory equipment for the heating of materials.

For European Economic Area

(In accordance with Council Directive 2006/95/EC of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits.)

EN 61010-1:2001 Safety requirements for electrical equipment for measurement, control, and laboratory use, Part 1: General Requirements + Amendments.

EN 61010-2-010:2003 Particular requirements for laboratory equipment for the heating of materials + Amendments.

For United States

UL61010-1:2004 Electrical Equipment for Laboratory Use; Part 1: General Requirements.

Electromagnetic Compatibility Standards

For Australia and New Zealand

AS/NZS CISPR11:2004 Limits and methods of measurement of electronic disturbance characteristics of industrial, scientific and medical (ISM) radio frequency equipment.

For Canada

ICES-001 Issue 4 June 2006 Interference-Causing Equipment Standard: Industrial, Scientific, and Medical Radio Frequency Generators.

For the European Economic Area

(In accordance with Council Directive 2004/108/EC of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility.)

EN61326-1:2006 Electrical equipment for measurement, control, and laboratory use-EMC requirements-Part 1: General Requirements. Emissions: Meets Class A requirements per CISPR 11. Immunity: Per Table 1 - Basic immunity test requirements.

For the United States

CFR Title 47 Telecommunication Chapter I Federal Communications Commission, Part 15 Radio frequency devices (FCC regulation pertaining to radio frequency emissions).

Safety



WARNING: The operator of this instrument is advised that if the equipment is used in a manner not specified in this manual, the protection provided by the equipment may be impaired.

AVERTISSEMENT: L'utilisateur de cet instrument est prévenu qu'en cas d'utilisation contraire aux indications du manuel, la protection offerte par l'équipement peut être altérée.



There are several major areas of concern pertaining to personal safety when using the UV Curing accessory. For all detailed information regarding safety, please refer to the *Omnicure™ User's Guide*.

Required Equipment

While operating this instrument, you must wear eye protection that either meets or exceeds ANSI Z87.1 standards. Additionally, wear protective clothing that has been approved for protection against the materials under test and the test temperatures.

Instrument Symbols


The following label is displayed on the UV shield for your protection:

Symbol	Explanation
	<p>This symbol on the front of the UV shield warns that ultraviolet light is present during operation of this instrument. DO NOT EXPOSE EYES OR SKIN TO ULTRAVIOLET LIGHT. Always wear the protective glasses provided when operating.</p> <p>Ce symbole affiché à l'avant de l'écran UV avertit de la présence d'un rayonnement ultraviolet pendant l'utilisation de cet instrument. N'EXPOSEZ PAS LES YEUX ET LA PEAU AU RAYONNEMENT ULTRAVIOLET. Portez toujours les lunettes de protection fournies lors de l'utilisation de l'instrument.</p>
	<p>This symbol on the front of the UV shield warns that a pinch point can be present between the edge of the ARES-G2 cover and the UV shield when raised. Take care when operating.</p> <p>Ce symbole apposé à l'avant de l'écran UV avertit de la présence d'un point de pincement entre le bord du couvercle de l'ARES-G2 et l'écran UV lorsqu'il est soulevé. Soyez prudent lorsque vous l'utilisez.</p>

Please heed the warning labels and take the necessary precautions when dealing with these areas. The *ARES-G2 UV Curing Accessory Getting Started Guide* contains cautions and warnings that must be followed for your own safety.

Electrical Safety

You must unplug the instrument *before* doing any maintenance or repair work; voltages as high as 120/240 VAC are present in this system.

	<p>DANGER: High voltages are present in this instrument. Maintenance and repair of internal parts must be performed only by TA Instruments or other qualified service personnel.</p> <p>DANGER: Présence de tensions élevées dans cet instrument. La maintenance et la réparation des pièces internes doivent être effectuées uniquement par TA Instruments ou tout autre personnel d'entretien qualifié.</p>
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Radiation Danger



DANGER: Wear the protective eye glasses provided and close the access door **BEFORE** beginning an experiment. **NEVER** look into the beam from the light guide, or a reflection of the beam. The high-intensity ultraviolet radiation can permanently damage the retina of your eye and result in blindness.

DANGER: Portez des lunettes de protection et fermez la porte d'accès **AVANT** de commencer toute expérience. **NE** regardez **JAMAIS** dans le faisceau du conduit de lumière ou dans une réflexion du faisceau. L'intensité élevée du rayonnement ultraviolet peut endommager irréversiblement la rétine de votre œil et entraîner la cécité.



DANGER: **NEVER** expose your skin or flammable objects to the UV beams. Exposure of skin surface will result in severe burns. **DO NOT** point the UV beam at a flammable object. A fire hazard exists.

DANGER: N'exposez **JAMAIS** votre peau ou des objets inflammables aux faisceaux UV. L'exposition de la surface de la peau peut entraîner de graves blessures. **NE** pointez **PAS** le faisceau UV sur un objet inflammable. Il existe un risque d'incendie.

Additional Safety Warnings



WARNING: For all detailed information regarding safety, please read the *Omnicure™ User's Guide*.

AVERTISSEMENT: Pour obtenir tous les renseignements concernant la sécurité, lisez le guide de l'utilisateur d'Omnicure™.

Warranty Information

CAUTION: Please take care when using your unit to protect it from misuse or mishandling. TA Instruments offers no warranty after the initial installation of the UV Curing Accessory, on the light guide, or the 100 W mercury lamp.

MISE EN GARDE: Pour protéger l'appareil d'une mauvaise utilisation ou manipulation, faites attention lorsque vous l'utilisez. TA Instruments n'offre aucune garantie après la première installation de l'accessoire de séchage UV, sur le conduit de lumière ou la lampe à mercure 100 W.

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Chapter: 1

Introducing the UV Curing Accessory

Overview

The UV Curing accessory is used with the TA Instruments ARES-G2 Rheometer for the curing of samples with ultraviolet or visible light irradiation. The accessory is available from TA Instruments with or without a UV light source. The light source that TA Instruments supplies with the UV Curing accessory is the Exfo Omnicure™ 2000 (shown in the figure below).

NOTE: TA Instruments supports the use of the Exfo Omnicure 2000. No other light source is currently supported.

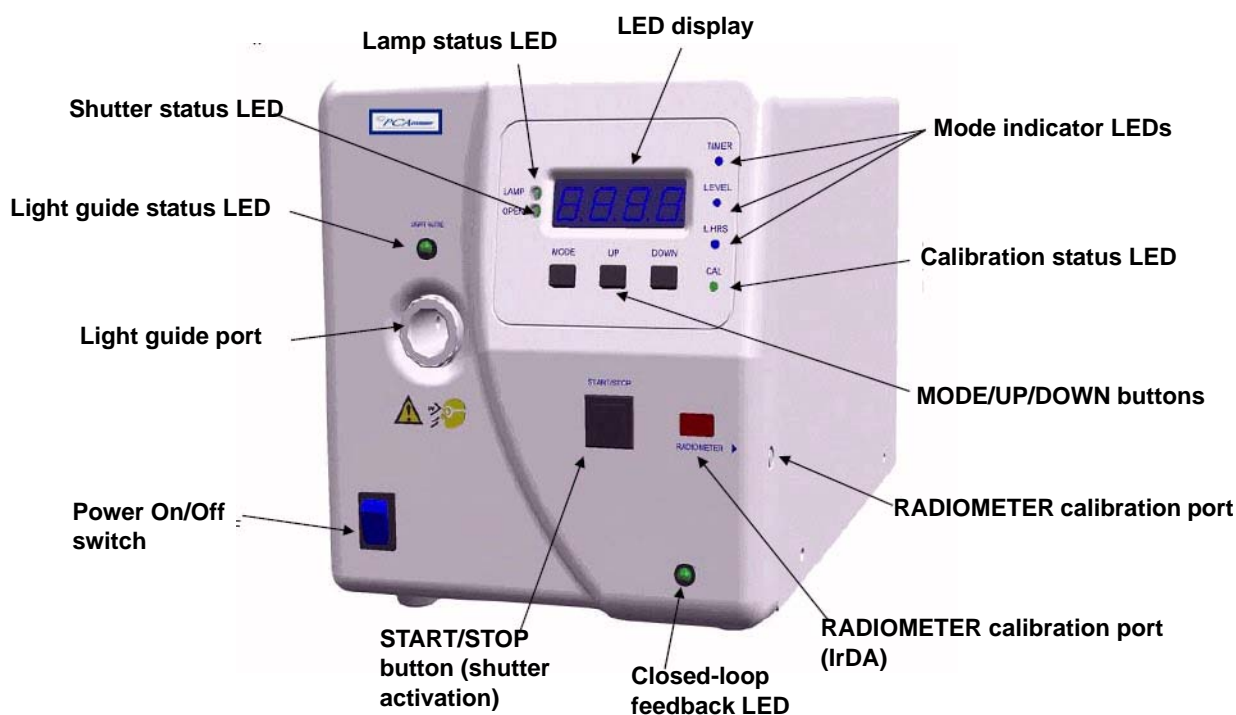


Figure 1 Omnicure 2000 components.

Omnicure™ is a trademark of EXFO Photonic Solutions, Inc., 2260 Argentia Road, Mississauga, Ontario, Canada L5N 6H7.

Product Description

The UV Curing accessory consists of a UV light source (Omnicure), which contains a high-pressure mercury lamp that delivers light over the spectral range 250 to 650 nm, along with the accessory items that are needed to operate the curing tests. A broadband filter (320 to 500 nm) is provided standard with the unit.

UV Curing Accessories

The UV Curing accessories consist of the items listed below. A brief description of each item follows. More details on installation and use of these items are found in the remainder of this manual.

- Light is transmitted from the UV light source to the ARES-G2 via a 1500-mm long, 5-mm diameter **light guide**.
- The **upper geometry** that will be installed on the ARES-G2 is specific for UV Curing. See the figure below for the parts of the upper geometry.

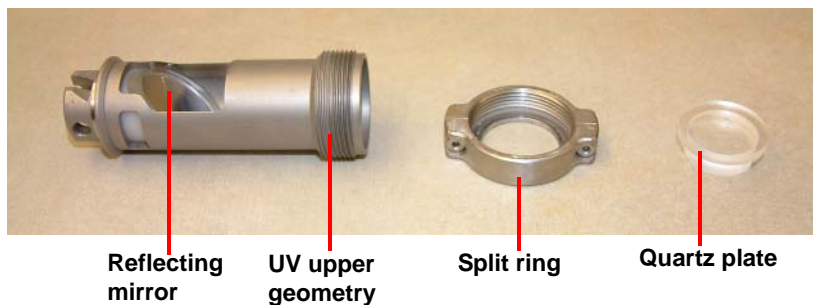



Figure 2 UV Curing accessory upper geometry parts.

- The **lower geometry** may use the regular or the disposable parallel plate fixture with a diameter of larger than or equal to 20 mm.
- The **UV light shield box** serves as a protective UV light barrier.

	WARNING: Although the UV Curing accessory contains a light shield box, it is still important to wear the safety glasses provided.
	AVERTISSEMENT: Bien que l'accessoire de séchage UV contienne un boîtier à écran, il est toujours important de porter les lunettes de sécurité fournies.

- The **collimating optics lens** focuses the UV light beam.
- The **optics alignment bracket** aligns the light beam with the sample position.
- The **RS-232 cable** establishes communication between the ARES-G2 and the light source.
- A **radiometer** is used to determine the UV light intensity at the sample.
- Two pairs of **safety glasses** are included.

Using the UV Curing Accessory

Main materials of interest for the ARES-G2 UV Curing accessory include UV-curable adhesives, coatings, and inks. UV-curable materials use ultraviolet light to cure or initiate curing, which allows a permanent bond without heating or excessive heat generation.

Most UV-curable materials start as low to medium viscosity fluids. Upon being irradiated, the material may exhibit a gel-point ($G' - G''$) crossover in as fast as 0.2 seconds and full cure within a few seconds, depending on the sample. In order to accurately capture the rapid changes and describe the cure, it is necessary to collect enough data points. This requires the use of the **Oscillation Fast Sampling** procedure within TRIOS Software.

Wavelength Range

The Omnicure UV light sources is a filter photometer instrument. A broadband filter supplied with the instrument covers 320 to 500 nm and is suitable for most UV studies. For any issues regarding the UV wavelength and filtering options, please refer to the *Omnicure™ User's Guide*.

Light Intensity

Light intensity, I , is generally referred to as “brightness”. Intensity is defined as the rate at which energy is transferred per unit area, and is measured in Watts per square meter (typically expressed as mW/cm^2).

The unit is based on a high-intensity, high-pressure mercury lamp capable of producing a total light intensity of about $30,000 \text{ mW}/\text{cm}^2$ with the Omnicure light source.

There is a further reduction in intensity, mainly due to the increase in aperture from the 5-mm diameter light guide to the 20-mm ARES-G2 upper plate, provided by the collimating optics and the UV mirror at the light entrance to the ARES-G2 upper plate.

A portable radiometer/dosimeter is provided to enable measuring of the light intensity at the upper plate. This is the intensity seen by the sample during the curing reaction. The intensity is a nearly linear function of the photometer intensity and can be adjusted using the light source controls.

With a new lamp, the maximum final intensity at the sample is about $200 \text{ mW}/\text{cm}^2$.

UV Dose

The UV dose is the product of the UV intensity (expressed as energy per unit surface area) and exposure time. Therefore, $\text{Dose} = I \times t$ expressed in units of mJ/cm^2 ; with $1 \text{ mJ}/\text{cm}^2 = 1 \times 10^{-3} \text{ watt-second}/\text{cm}^2 = 1 \text{ mW-second}/\text{cm}^2$. The dose can be adjusted by varying the intensity and the exposure time, keeping in mind that the intensity is the level measured at the plate surface with the portable radiometer, not the intensity level programmed into the UV light source.

Exposure Time

Photoinitiated curing reactions are fast rheological events. Complete cure is achieved in several seconds to several minutes. This can make differentiating the curing behavior of similar materials difficult, even if low-light intensities are used. The ability to vary exposure time, therefore, provides an additional experimental variable that can help improve differentiation of behavior and/or provide conditions that better mimic those found in real-world processes (e.g., photocuring of a film coating as the film rapidly passes under a light source).

Chapter: 2

Setting Up the UV Curing Accessory

This chapter briefly describes the setup of the UV Curing accessory and accessories on the ARES-G2. For more details, consult TRIOS software online help and the *Omniculture™ User's Guide*. The various components provided with the UV Curing accessory and its accompanying accessory kit will be used in the setup.

Installing the UV Curing Accessory

Follow the instructions below to install the UV Curing accessory and the accessories on the ARES-G2.

Installing the Omnicure UV Light Source

NOTE: Install the UV device lamp before beginning these installation procedures. Refer to the Omnicure 2000 documentation for instructions.

Follow the instructions below to install the Omnicure UV light source:

- 1 Place the UV light source on the right side of the table top next to the ARES-G2 instrument so that you have access to the back panel.

CAUTION: Do not plug in the power cord for the UV light source until directed to do so later in these instructions.

MISE EN GARDE: Branchez le cordon d'alimentation à la source de lumière UV uniquement lorsqu'il vous sera demandé de le faire dans le manuel d'instructions.

- 2 Connect the RS-232 cable from **P3** on the back of the UV light source (shown in the figure below) to **COM 2** on the upper rear panel of the ARES-G2.



Figure 3 Rear of UV light source.

- 3 Turn around the UV light source so that it faces forward again, and proceed with the instructions below.

Installing the UV Curing Accessories

Follow these instructions to install the UV shield and light-source optics.

NOTE: If you intend on using the Advanced Peltier System (APS) with the UV Curing accessory, install the APS before installing the UV shield apparatus. Refer to the *APS Getting Started Guide* for installation instructions and other information pertinent to the APS.

- 1 Obtain the UV shield apparatus from the accessory kit. The parts of the shield are shown in the figure below.

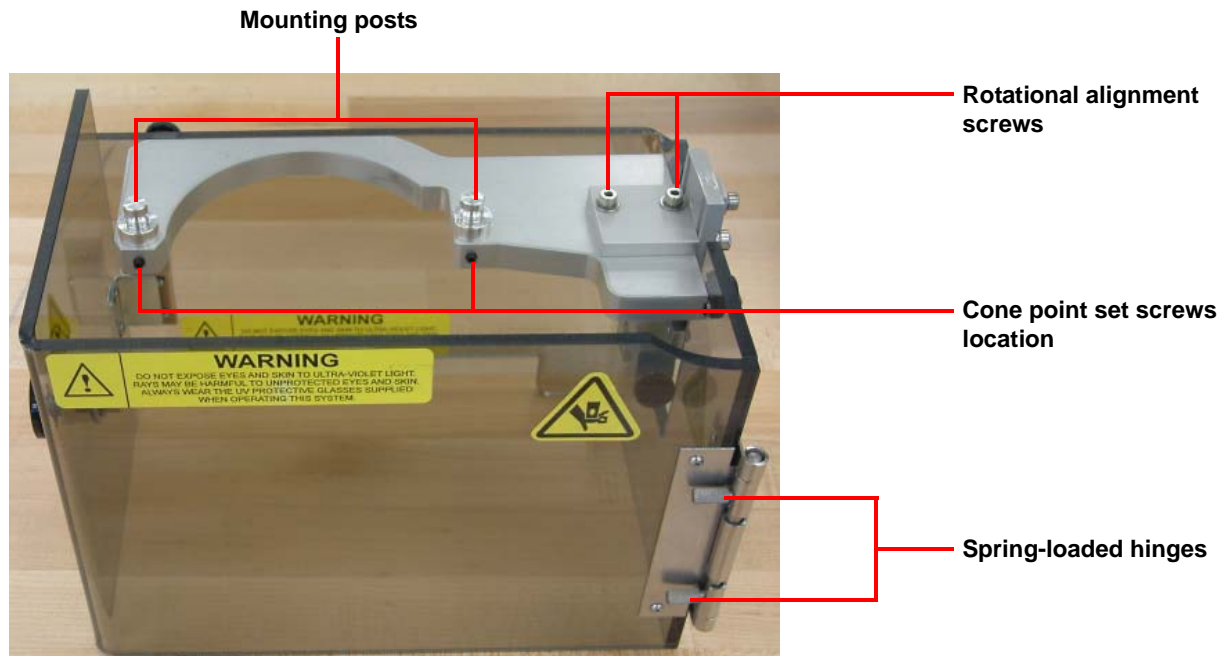


Figure 4 UV shield apparatus.

- 2 Remove the access door by squeezing the spring-loaded hinges together and pulling the door off.
- 3 Install the UV shield (without the door) on the underside of the stage as follows:
 - a Locate the mounting post holes circled in [Figure 5](#) below.

- b Using a 2-mm hex wrench, loosen the cone point set screws that correspond with the mounting post locations circled in the figure below. Do this on both sides of the ARES-G2.

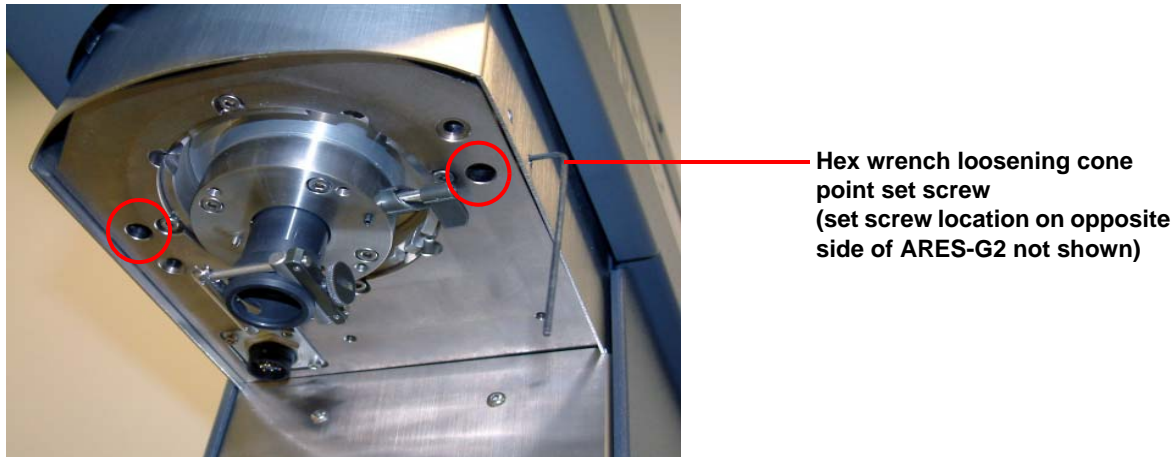


Figure 5 UV shield mounting post and set screw locations on underside of ARES-G2 stage.

- c Position the UV shield beneath the mounting post locations and raise the UV shield until the mounting posts are inserted into the appropriate locations.
- d While holding the UV light shield in place, tighten the cone point set screws that were loosened in [step b](#) above.
- 4 Obtain the collimating optics lens from the accessory kit. Place the lens into the bracket with the light guide thumbscrew pointing downward. Tighten the black knurled knob to hold it in place. (The lens adjustment screw, shown in the figure below, will be used later to adjust the focus of the UV light beam.)

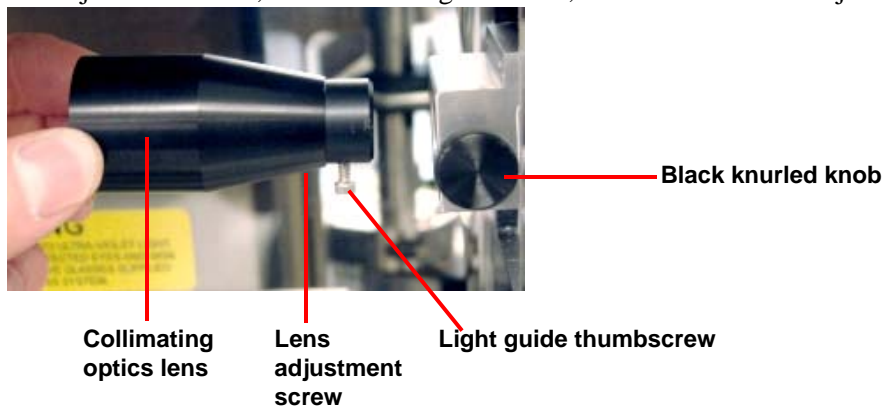


Figure 6 Installing the collimating optics lens.

- 5 Install the UV upper geometry as you would any other ARES-G2 upper geometry; however, do **not** install the upper PRT with this geometry. Align the scribe mark on the FRT shaft with the scribe mark on the tool holder (Figure 8). Ensure that the geometry mirror is facing the collimating optics lens. Tighten the thumbscrew to hold it in place. See the figure below.

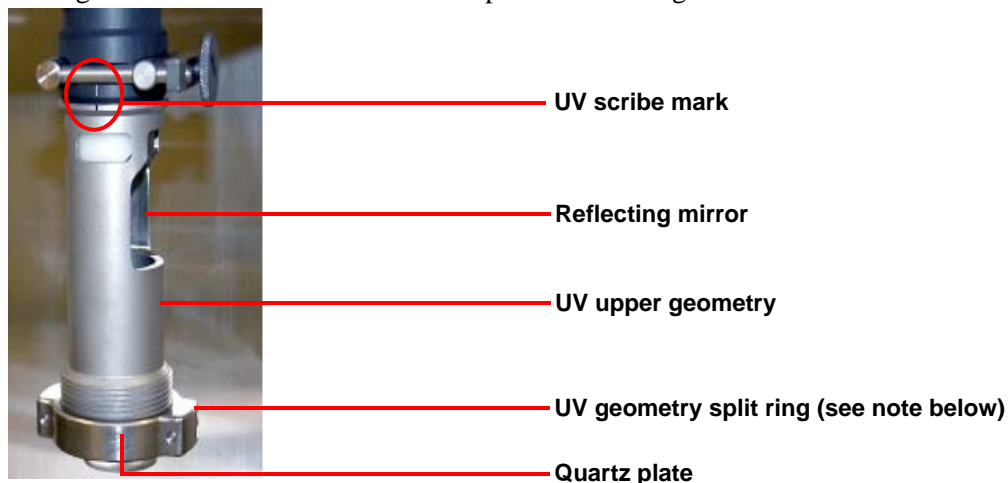


Figure 7 Installing the UV upper geometry.



Figure 8 UV scribe mark.

NOTE: The UV geometry split ring holds the upper geometry and the quartz plate together (as shown in the image above) and can be removed using the two hex head screws. When using the UV Curing accessory with the Advanced Peltier System (APS) and disposable lower plates, the upper and lower plates may fuse during a cure; removing the split ring allows the user to remove the plates from the instrument. Refer to the *APS Getting Started Guide* for additional information. Additionally, removing the split ring may be necessary for cleaning purposes (as described in [“Maintaining the UV Light Source” on page 25](#)).

- 6 Install the disposable parallel plate geometry with a 20-mm metal plate into the bottom fixture. Do **not** install the lower PRT with this geometry. Tighten the knurled thumbscrew after installation. See the figure below.

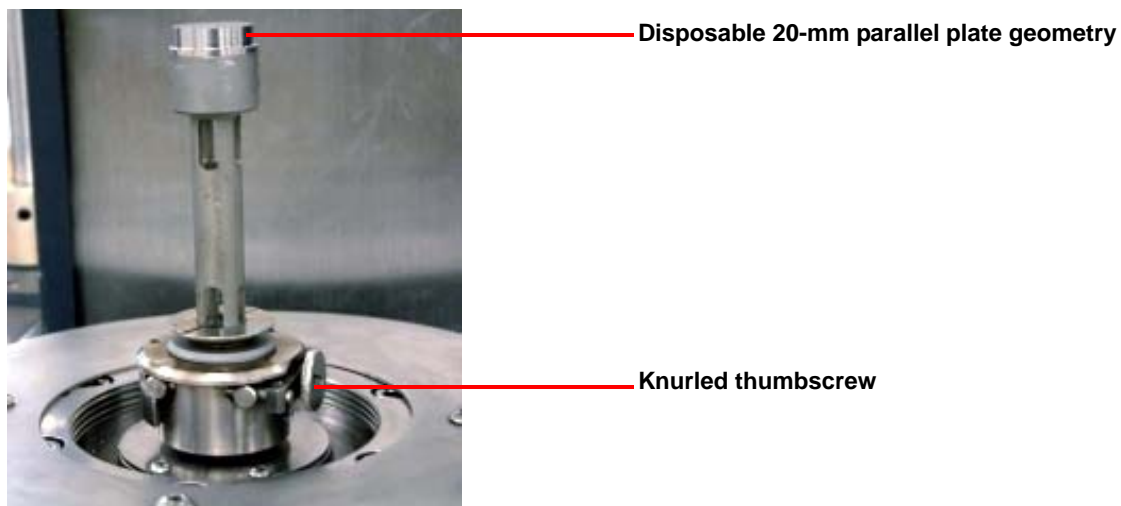


Figure 9 Installing the disposable parallel plate.

- 7** Insert the light guide into the opening behind the collimating lens. **Never grip the light guide in a place other than the strain-relief nearest the ends of the light guide.**

- 8 Tighten the light guide screw underneath the lens to hold the guide in place. See the figure below.

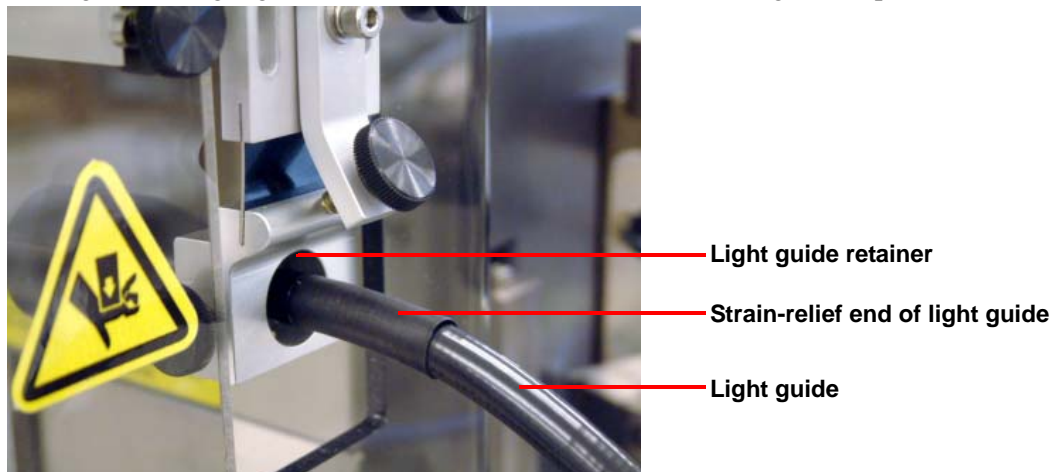


Figure 10 Installing the light guide.

- 9 Install the access door on the light shield by squeezing the spring-loaded handles and reinserting the hinged portion.

- 10 The UV Curing accessories are now fully installed. Refer to the figure below.

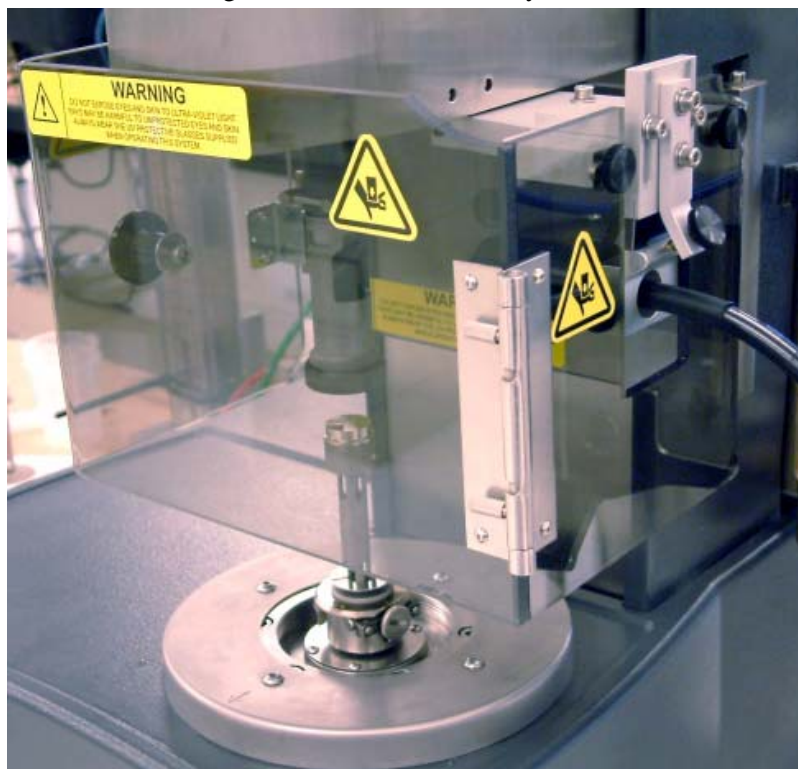


Figure 11 UV Curing accessories fully installed.

- 11 Insert the light guide into the light guide retainer until it seats with a positive click. **Never grip the light guide during installation and removal in a place other than the strain-relief nearest the ends of the light guide.**

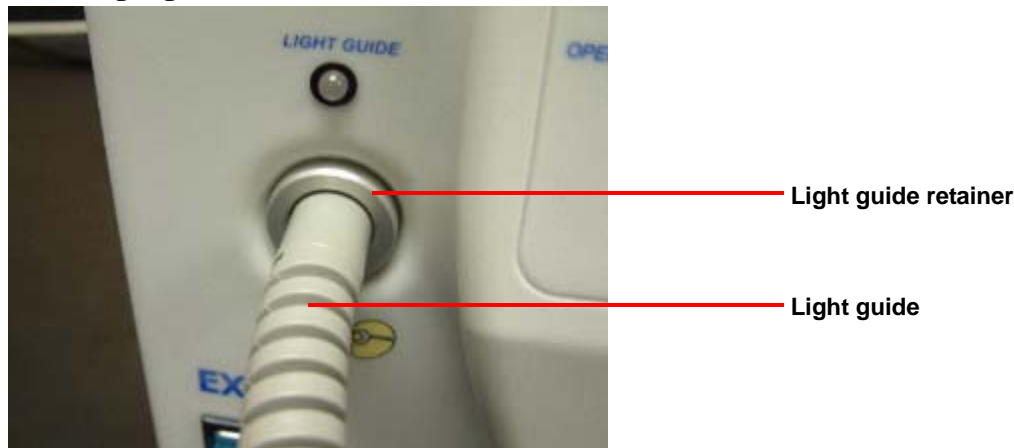


Figure 12 Inserting the light guide into the light guide retainer.

- 12 If installing the external filter adapter, proceed to the next section. Otherwise, plug the Omnicure S2000 into an electrical outlet and turn the power on.

NOTE: System preparation steps are necessary before operating the UV Curing accessory. Refer to [Chapter 3](#) for additional information.

Installing the External Filter Adapter (Optional)

The UV Curing accessory external filter adapter is an optional adapter used to narrow the spectral range to a specific wavelength. The instructions below provide steps for properly and safely installing the external filter adapter on the Omnicure S2000. The accessory is assembled starting at the ARES-G2 Rheometer and working back to the Omnicure S2000.



WARNING: Closely follow the instructions below; deviation from these instructions could result in personal injury. Never turn the power on to the Omnicure S2000 until the light guide and external filter adapter have been fully installed as described below.

AVERTISSEMENT: Suivez attentivement les instructions ci-dessous ; tout écart avec ces instructions pourrait entraîner des blessures corporelles. Ne mettez jamais l'Omnicure S2000 sous tension tant que le conduit de lumière et l'adaptateur du filtre externe ne sont pas installés tel que décrit ci-dessous.

- 1 If it is turned on and plugged in, turn off and unplug the Omnicure S2000.
- 2 Insert the Omnicure S2000 end of the light guide into the external filter adapter, ensuring it is fully seated (as shown in [Figure 13](#)), and tighten the set screw using the 1.5-mm Allen wrench provided.

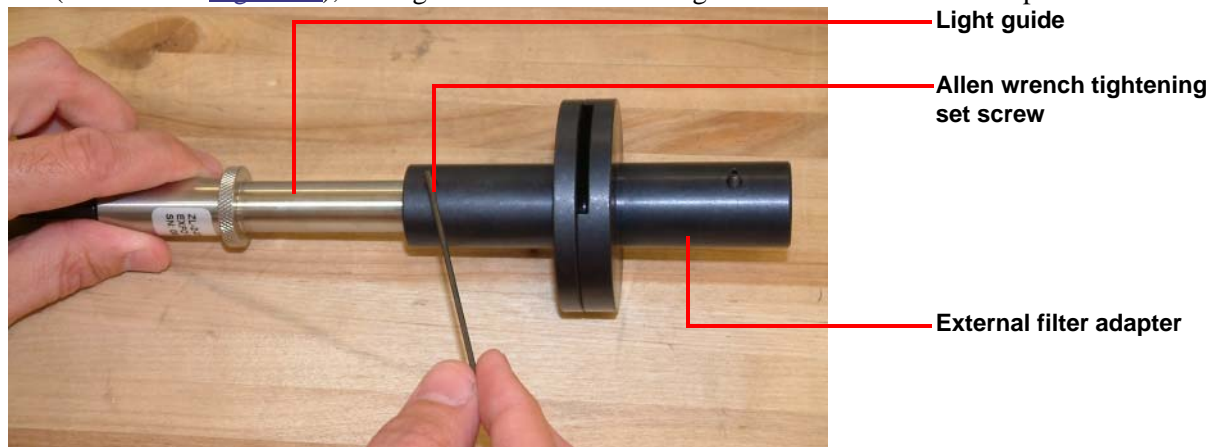


Figure 13 Light guide installed in external filter adapter.

- 3 Insert the narrow end of the lamp output test adapter into the other end of the external filter adapter assembly. Ensure that the lamp output test adapter is fully seated. Tighten the set screw using the 1.5-mm Allen wrench in order to secure the connection. See [Figure 14](#).

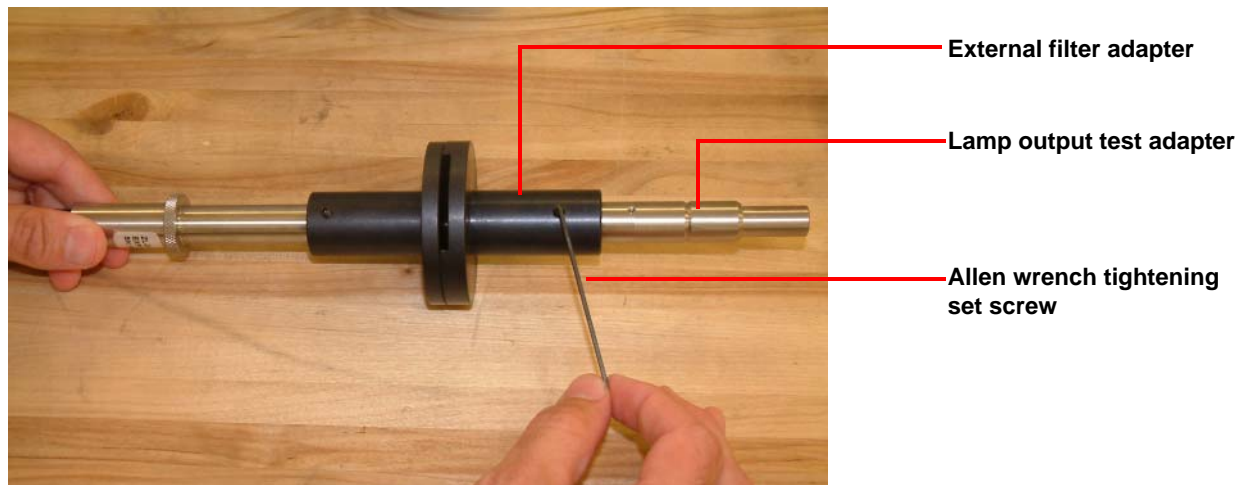


Figure 14 Lamp output test adapter installed in external filter adaptor.

- 4 Insert the desired filter into the slot on the external filter adapter assembly, as shown in [Figure 15](#). Ensure that the filter is fully seated.



WARNING: Never use the external filter adapter without an external filter inserted into the slot. Failure to operate the device in this way can expose the user to harmful radiation. Please follow all recommended safety precautions in this Getting Started Guide.

AVERTISSEMENT: N'utilisez jamais l'adaptateur de filtre externe sans un filtre externe inséré dans la fente. Le non respect des règles d'utilisation de l'appareil peut exposer l'utilisateur à un rayonnement nocif. Respectez toutes les précautions de sécurité recommandées dans le guide de démarrage.

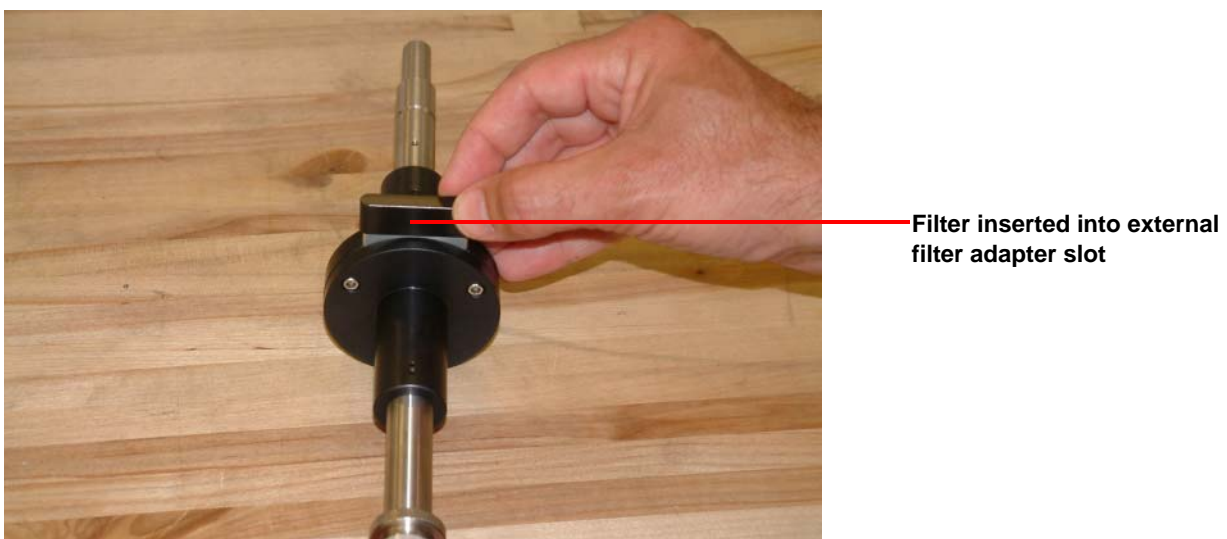


Figure 15 Installing the filter in the external filter adapter slot.

- 5 Insert the other end of the lamp output test adapter into the Omnicure S2000, as shown in [Figure 16](#).



Omnicure S2000

Figure 16 Lamp output test adapter connected to Omnicure S2000.

- 6 Finally, plug the Omnicure S2000 into an electrical outlet and turn the power on.

If it is desired to change filters or remove the external filter holder completely, first power down the Omnicure S2000. To change filters, remove the currently installed filter and then insert the desired filter. To remove the external filter adapter, follow the above instructions in reverse.

NOTE: System preparation steps are necessary before operating the UV Curing accessory. Refer to [Chapter 3](#) for additional information.

Chapter: 3

Operating the UV Curing Accessory

This chapter briefly describes the operation of the UV Curing accessory. For more details, consult TRIOS online help and the *Omniculture™ User's Guide*.

Establishing Connection with TRIOS

In order to operate the UV Curing accessory, you must first establish a connection through the instrument control software (TRIOS software). Note that TRIOS V1.8 or higher is required for UV Curing control.

- 1 Connect to the instrument through the TRIOS software.
- 2 Click the TRIOS icon at the top-left corner of the application.
- 3 Select **Options** from the drop-down menu.
- 4 Select **ARES G2 > Accessory** to display a list of hardware configuration options.
- 5 In the **Active Hardware Accessory** section, select **UV Curing**.
- 6 In the **UV Curing** section, select the applicable **UV Source**.
- 7 For information on the **Lamp Calibration** field, refer to *Adjusting and Focusing the UV Light Beam* in TRIOS Help.
- 8 Click **OK** to save configuration and close TRIOS Options window.

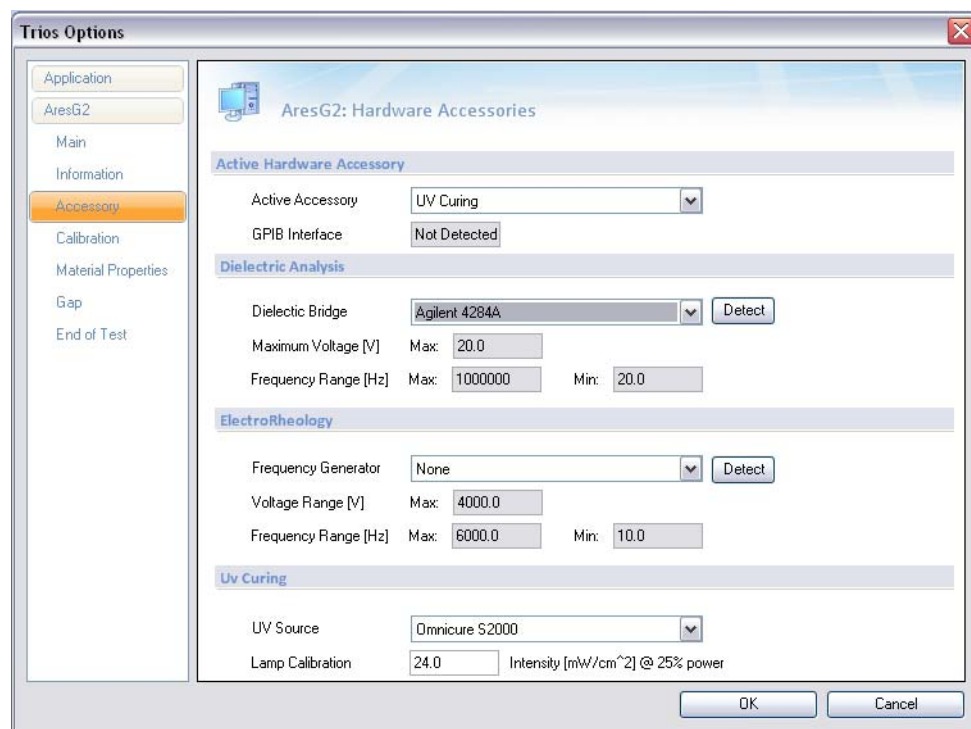


Figure 17 TRIOS Options window.

Preparing the System



WARNING: Do not turn on the light source until the accessory has been fully installed (refer to Chapter 2 for additional information).

AVERTISSEMENT: N'allumez pas la source de lumière tant que l'accessoire n'a pas été entièrement installé (reportez-vous au Chapitre 2 pour des renseignements supplémentaires).

The UV light source can be operated in two modes: **Relative** or **Absolute**. If you elect to use the **Absolute** mode, you will be required to calibrate the light source with an external Omnicure radiometer (not supplied). Please refer to the *Omnicure™ User's Guide* for detailed information. However, TA Instruments recommends that you use **Relative** mode for UV curing analysis, given that the final intensity calibration is on the sample.

NOTE: The UV light source operates in **Relative** mode by default unless the calibration mentioned above is performed.

After the UV Curing accessory has been installed as directed in [Chapter 2](#), it is necessary to perform the following procedures before running an experiment:

- 1 Adjusting the UV light beam.
- 2 Visually aligning the UV light beam.
- 3 Focusing the UV light beam.
- 4 Adjusting the light intensity at the sample.

For detailed information related to the above procedures, refer to “Adjusting and Focusing the UV Light Beam” Help topic in TRIOS software.

Operating the UV Curing Accessory

Before operating the UV Curing accessory, it is important to adjust and focus the UV light beam. Refer to “Adjusting and Focusing the UV Light Beam” Help topic in TRIOS software before proceeding with any experiments.

Operating the UV Curing accessory on the ARES-G2 Rheometer requires the following steps:

- 1 Selecting and preparing the sample.
- 2 Selecting and installing the appropriate geometry.
- 3 Setting up your experiment through TRIOS software.
- 4 Zeroing the gap at the subsequent, initial experimental temperature.
- 5 Loading and trimming the sample, as required.
- 6 Starting the test.

For detailed information related to the above procedures, refer to “Operating the UV Curing Accessory” Help topic in TRIOS software.

Maintaining the UV Curing Accessory

The sections below describe the UV Curing accessory maintenance procedures.

Maintaining the UV Light Source

Maintenance of the UV Curing accessory light source consists primarily of minor cleaning and replacement of the air filter at the back of the fan, along with other routine care. See the *Omniculture™ User's Guide* for details on these procedures.

NOTE: The lamp output changes over time. You may need to replace the bulb when performance begins to drop. See the *Omniculture™ User's Guide* for details.

Cleaning the UV Light Guide Lenses

TA Instruments recommends that you routinely inspect the UV light guide lenses to ensure that no material is on either lens; doing so prevents materials from degrading, fusing to the lens, and consequently interfering with the UV beam.

NOTE: After cleaning the UV light guide lenses, TA Instruments recommends re-calibrating the light guide intensity. See “Adjusting the Light Intensity at the Sample” Help topic in TRIOS Software for additional information.

- 1 If necessary, turn off the UV light source and remove the UV light guide from the light source and the collimating lens.
- 2 Use a loop or magnifying glass to inspect both lenses on the light guide (shown below).



Figure 18 Light guide lenses to inspect.

- 3 If material is present on either lens, remove the material using alcohol and a single-edged razor.
- 4 Once the material is removed, wipe the lenses clean and re-install into your UV Curing accessory.

Cleaning the UV Curing Upper Geometry

Depending upon the sample being analyzed, it may be necessary to clean the UV Curing accessory upper geometry after certain tests. Remove the upper geometry split ring in order to access the geometry quartz plate, if necessary.

The geometry quartz plate surface can be cleaned with acetone or alcohol using a non-abrasive tissue. Do not rub excessively or small scratches may be made on the surface, which may interfere with your testing.

Replacement Parts

Replacement parts are available from TA Instruments. See the table below when ordering parts.

Table 1: Replacement Parts for UV Curing Accessory

Part Number	Description
200400.001	Light guide, 5-mm diameter, 1500-mm length
200403.001	UV safety glasses
270712.002	RS-232, M/F 9 pin, 10 ft
271388.001	Fuse, 5A, 250V, fast blo, 5x20 mm
402303.901	Geom disp disc 20-mm 316 SST lower plate
403064.901	20-mm diameter acrylic disk, upper plate, (pack of 10)
403065.901	20-mm diameter aluminum disk, lower plate, (pack of 10)
403147.001	Thumbscrew, #10-32 x ½" long
403153.001	20-mm diameter quartz disk
403155.901	Upper geometry assembly with quartz disk
403170.001	Portable radiometer, 500 mW, 280 to 400 nm
403171.002	20-mm diameter stainless steel disk, lower plate
403172.901	Collimating optic lens assembly
545852.001	Sample trimming tool
708.01014.L	Lower plate, disposable disk
935013.002	Air filter kit, package of 10
935021.002	Lamp, 200W standard curing mercury DC arc

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