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# OPERATOR'S MANUAL

## *SPECTROLINE*<sup>®</sup>

### 11SC-1, 11SC-2 and 36-380 Miniature Ultraviolet Quartz Pencil Lamps and SCT-1A Power Supply



## **SPECTRONICS CORPORATION**

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**DANGER - Ultraviolet radiation emitted from this product. Avoid exposure. ALWAYS WEAR PROTECTIVE CLOTHING. EXPOSURE MAY CAUSE PREMATURE AGING OF THE SKIN AND CANCER. ALWAYS WEAR PROTECTIVE EYEWEAR; FAILURE TO DO SO MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYE. Never look directly into the lamp. Exposure can cause eye and skin allergy and allergic reactions. Medications or cosmetics may increase your sensitivity to ultraviolet radiation. Consult physician before operating this product if you are using medication or have a history of skin problems or believe yourself especially sensitive to sunlight.**

**For Professional Use Only**



**WARNING**

**Please read the instructions in this manual carefully before using your Spectrolite® UV quartz lamp. Never use this equipment in any manner not specified in these instructions because the protection provided by the equipment may be impaired.** We recommend using Spectrolite UV-absorbing protective eye and face wear (i.e., UVS-30 spectacles, UVG-50 goggles or UVF-80 face shield).



**LAMP CONTAINS MERCURY**

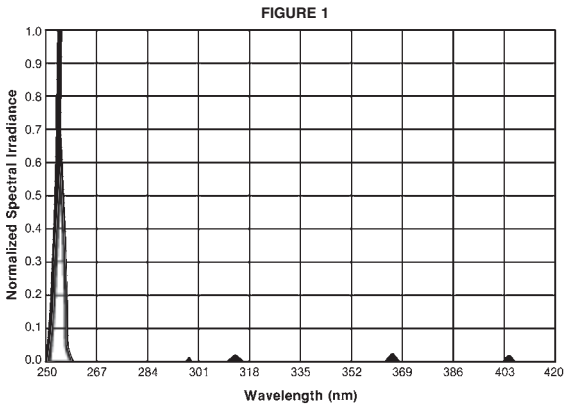
**Manage in Accord with Disposal Laws**

**See: [www.lamprecycle.org](http://www.lamprecycle.org)**

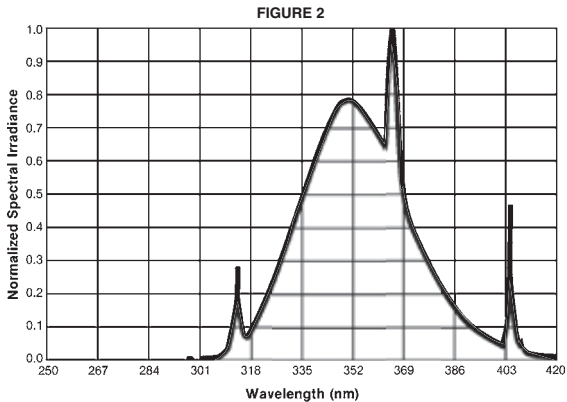
## INTRODUCTION

The Spectroline 11SC-1, 11SC-2 and 36-380 quartz pencil lamps are small, low-pressure, mercury vapor discharge lamps made of double-bore material with both electrodes at one end. When used properly, they are very stable lamps and maintain a high output of ultraviolet radiation over several thousand hours.

These pencil lamps have a spectral emission characteristic of a low-pressure mercury discharge consisting of many well-separated lines in the ultraviolet, visible and infrared parts of the spectrum (see figures 1 and 2). They are widely used as spectral calibration sources in spectroscopy, chromatography and photometry, and many other laboratory and industrial applications.



SPECTRAL IRRADIANCE OF SPECTROLINE 11SC-1 AND 11SC-2 QUARTZ PENCIL LAMPS



SPECTRAL IRRADIANCE OF SPECTROLINE 36-380 QUARTZ PENCIL LAMP

- The **11SC-1** is a short wave (254nm) ultraviolet lamp with a lighted tube length of 2 1/8 in (5.4cm), 1/4 in (0.64cm) outside diameter (OD). It may be used alone or with any of three separately available light shields, each with a different aperture for directing the light.
- The **11SC-2** is a short wave UV lamp with a lighted tube length of 3/4 in (1.9cm), 1/4 in (0.64cm) OD. Because of its shorter length, no light shields are available.
- The **36-380** is a long wave (365nm) UV lamp with a lighted tube length of 2 1/8 in (5.4cm), 3/8 in (0.95cm) OD. The lamp is encased in a tubular glass filter that absorbs visible white light while transmitting maximum UV intensity.

## **INSTALLATION**

### **UNPACKING AND INSPECTION**

Unpack the pencil lamp and power supply and inspect them thoroughly for possible damage from shipment. Check the electrical performance as soon as possible according to the instructions below. If damage is noted, immediately notify the carrier and supplier before using the equipment.

Save the shipping cartons and packing materials for future storing and shipping of the lamps or power supply.

### **PREPARATION FOR USE**

The Spectroline SCT-1A and SCT-1A/F power supplies are available separately. They provide correct electrical characteristics to operate the 11SC-1, 11SC-2, and 36-380 lamps efficiently. Only properly matched lamps and power supplies, as specified by Spectronics Corporation, should be paired together for operation.

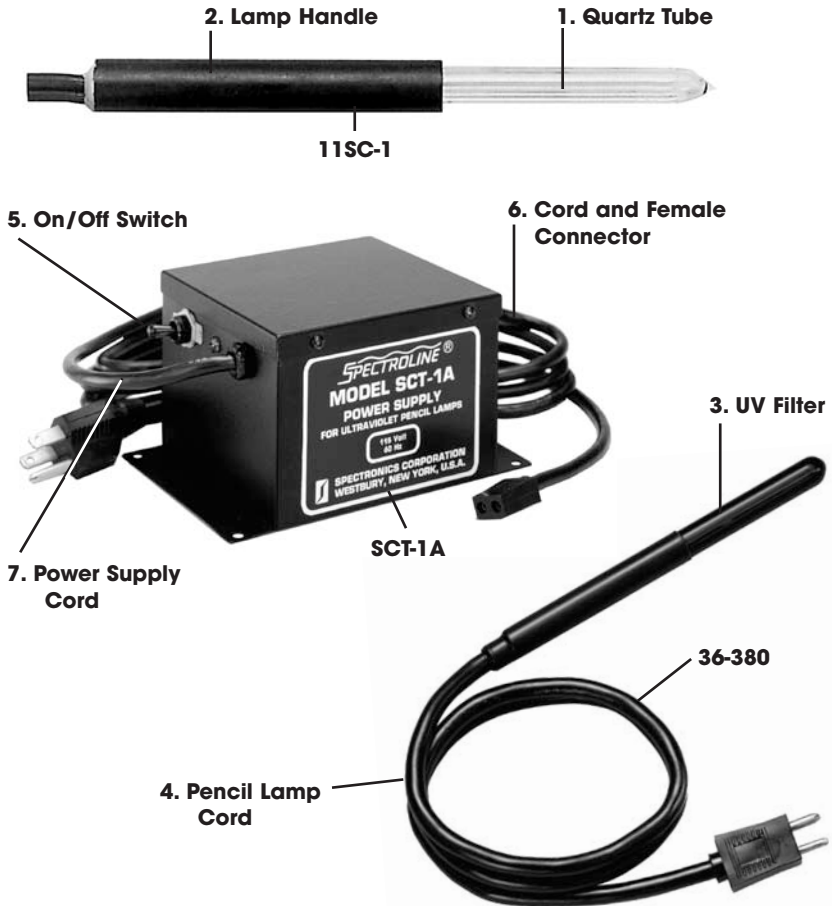


### **WARNING—HIGH VOLTAGE**

Make certain that the power supply is unplugged from electrical outlet when installing pencil lamps.

## DESCRIPTION

- |                                    |  |
|------------------------------------|--|
| 1. Quartz Tube                     | Emits ultraviolet light.   |
| 2. Lamp Handle                     | Insulating material protects user from voltage transferred from power supply and from heat produced by lamp. |
| 3. UV Filter<br>(36-380 lamp only) | Absorbs visible light and transmits long wave ultraviolet light.   |
| 4. Pencil Lamp Cord                | Transfers power from SCT-1A power supply to pencil lamp.   |
| 5. On/Off Switch                   | Connects/disconnects power to lamp.  |
| 6. Cord and Female Connector       | Point of connection of lamp cord to power supply.  |
| 7. Power Supply Cord               | Supplies power from AC outlet.   |



## OPERATION

### **WARNING**

Avoid handling the quartz tube of the pencil lamp with fingers. Skin oils will etch the tube surface. Always use a clean cloth or gloves.

### **PRELIMINARY CHECKS**

1. The toggle switch of the power supply should be in the "OFF" position before it is plugged into the AC outlet.
2. Make sure the lamp is securely connected to the power supply before the system is turned on.
3. Make sure that the power supply is connected to an electrical outlet that conforms to the power requirements noted on the label.

### **GENERAL OPERATION**

After reviewing preliminary precautions, plug the power supply into an appropriate AC outlet. Point the pencil lamp toward the area to be illuminated and switch the power supply on.

### **IDEAL OPERATING CONDITIONS**

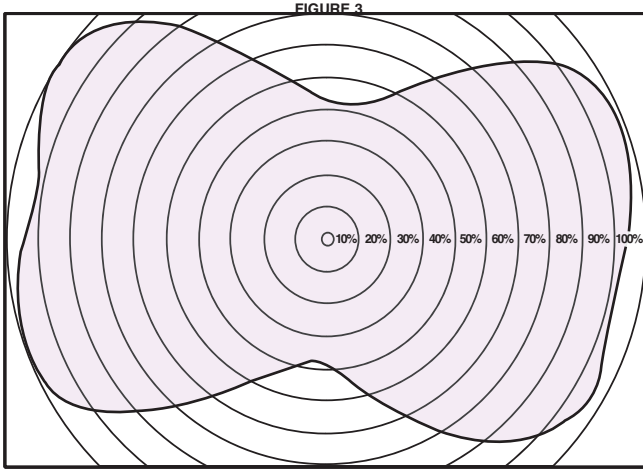
The minimum temperature on the inside surface of its quartz tube (usually at the tip) determines the quality of a pencil lamp's output. This temperature results from heat generated by the lamp itself, as well as from heat transferred to or from the lamp through any portion of the lamp. Optimum 254nm output is achieved when the lamp surface temperature is approximately 149°F (65°C). Deviations will lead to less than optimum output.

Thus, the lamp's performance depends on how and where it is used, as well as its construction. Aluminum-handled lamps, for example, may not operate optimally because of heat loss through the handle. Many users insulate or attach such lamps to heaters to maintain optimum output. Alternatively, insufficient heat loss, which may happen when using a phenolic-handled lamp in a small enclosure, can cause the lamp to run at higher than optimal temperatures. Ventilation can lower the temperature of the lamp surface, but irregular ventilation may result in unstable operation.

Please note that less than ideal use of the lamp may reduce lamp life via electrode destruction or stress on the metal-glass seals inside the lamp.

## POLAR INTENSITY PROFILE

All double-bore pencil lamps, such as the 11SC-1, 11SC-2 and 36-380, produce uneven irradiance around their quartz tubes, especially at close range. Distinct areas of lower irradiance occur near the glass-dividing wall, which is visible inside the tube between the two electrodes. Figure 3 illustrates the relative intensities around the 11SC-1 and 11SC-2 lamps, with respect to this wall.



POLAR DIAGRAM OF TYPICAL IRRADIANCE AT 1/2" FROM THE SURFACE OF  
SPECTROLINE 11SC-1 AND 11SC-2 QUARTZ PENCIL LAMPS

When a phosphor-coated lamp, such as the 36-380, is used, this variation is less pronounced. The irradiance pattern resembles a broad ellipse, with its shortest radius in line with the wall.

## OPERATION ON DC CURRENT

DC operation is strongly discouraged because migration effects in the lamp can lead to eventual extinction of the discharge. Furthermore, the lamp is mechanically designed for AC operation, being made with identical electrodes.

However, if DC operation is necessary the polarity of the electrodes should be reversed periodically to counteract the detrimental polarizing effects of this type of operation. The period will depend upon the lamp temperature, the electrical current in the lamp, and the reduction in intensity that can be tolerated.

**NOTE:** The Spectroline SCT-1A and SCT-1A/F power supplies are specified for AC operation only.

## ACCESSORIES

### USING 11SC-1 WITH LIGHT SHIELDS

Light shields are available separately for the 11SC-1 lamp with different apertures for directing the light source.

- **Shield A** has a 0.04 in (0.10cm) ID drill hole and is used where point emission is desired.
- **Shield B** has a 5/16 x 5/8 in (0.79 x 1.59cm) window and is frequently used as a source shield for interferometers.
- **Shield C** has a larger window, 3/16 x 1 1/2 in (0.48 x 3.8cm) and is widely used in calibrating spectrophotometers.

To operate, slip the open end of the light shield over the 11SC-1 lamp tube. The base of the shield should fit snugly over the lamp handle. With the power supply switched "on," point the open part of the shield toward the area to be illuminated.

### USING 11SC-1 WITH 2537FA FILTER ASSEMBLY

For applications in which "pure" short wave UV radiation is required, the 2537FA filter assembly (available separately) absorbs visible light and primarily transmits 254nm radiation.

Installation and operation of the 2537FA filter assembly with the 11SC-1 is identical to that of the light shields (above).



#### WARNING

If the filter assembly is hand-held, UV-absorbing face wear (such as the Spectroline UVF-80 face shield) and protective clothing is strongly advised. Short wave pencil lamps produce hazardous ultraviolet radiation. **Do not expose eyes or skin.**

### MAINTENANCE

As with all metal vapor discharge lamps, the output of the quartz pencil lamp slowly decreases throughout its life. The actual end of the useful life will depend upon the lamp's application.

Note that dust collecting on the lamp can easily cause more output loss at the irradiated surface than that caused by the age of the lamp. To maintain maximum intensity, the lamp should be periodically cleaned (after power has been shut off) with an alcohol-dampened, lint-free cloth.



## **STORAGE**

All components should be stored in a place free from temperature or humidity extremes, vibration or mechanical shock, dust or corrosive fumes, and strong electrical or electromagnetic interference. (Using the lamp in such areas should also be avoided).

## **ENVIRONMENTAL CONDITIONS**

These UV pencil lamps are designed to be safe under the following conditions:

- Indoor use;
- Altitude up to 2,000 m (6,562 ft);
- Temperature 5°C to 40°C (41°F to 104°F);
- Maximum relative humidity 80% for temperatures up to 31°C (88°F) decreasing linearly to 50% relative humidity at 40°C (104°F);
- Mains supply voltage fluctuations not to exceed  $\pm 10\%$  of the nominal voltage;
- Installation Category II;
- Pollution Degree 2.

## **WARRANTY**

The warranty policy for the Spectroline UV quartz pencil lamps is provided on the Certificate of Limited Warranty enclosed separately with each unit.

**NOTE:** For assistance of any kind, including help with a unit under warranty, contact the Customer Service Department at Spectronics Corporation. In the U.S. and Canada, call toll-free 1-800-274-8888. Give full details of the difficulty and include the model and serial numbers of the unit and the date of purchase.

If return of the unit to the factory is deemed necessary, shipping instructions will be provided. If an estimate of charges for nonwarranty work or other services is required, a quote will be furnished upon evaluation of the unit. Out-of-warranty service work will not be performed without customer approval.

## **SHIPPING**

Carefully pack the unit in the original shipping container and packing materials. Insure it for full value and ship it prepaid to the factory.

## TROUBLESHOOTING

<b>Symptom</b>	<b>Probable Cause</b>	<b>Cure</b>
1. Will not light	(a) Lamp temperature too cold	(a) Warm lamp in hand (with power off) or store/use lamp in warmer environment (above 60°F/15.6°C)
	(b) Power supply voltage	(b) output too low Replace power supply
	(c) Lamp cracked	(c) Replace lamp
	(d) Lamp life expired	(d) Replace lamp
	(e) Lamp not connected to power supply	(e) Check lamp/power connections
2. Abnormally low intensity emitted	(a) Lamp at end of useful life	(a) Replace lamp
	(b) Lamp being used in temperature-extreme environment	(b) Regulate temperature or air circulation
	(c) Current from power supply to lamp too low	(c) Replace power supply
	(d) Lamp dirty	(d) Clean lamp

## ORDERING INFORMATION

### Description

POWER SUPPLY, 120 Volts/60Hz

POWER SUPPLY, 230 Volts/50Hz

LIGHT SHIELD with 0.04 inch ID drill hole (for 11SC-1)

LIGHT SHIELD 5/16 x 5/8 inch window (for 11SC-1)

LIGHT SHIELD 3/16 x 1 1/2 inch window (for 11SC-1)

FILTER ASSEMBLY (for 11SC-1)

UV-ABSORBING SPECTACLES, CLEAR

UV-ABSORBING GOGGLES

UV-ABSORBING FACE SHIELD

### Part No.

SCT-1A

SCT-1A/F

Shield A

Shield B

Shield C

2537FA

UVS-30

UVG-50

UVF-80

