



## **FK11 PRECISION FIBER CLEAVER USER'S GUIDE**

**Photon Kinetics, Inc.**  
9305 S.W. Gemini Drive  
Beaverton, Oregon 97008 USA

**tel** +1 503 644 1960

**fax** +1 503 526 4700

Technical Response Center tel: +1 503 526 4678  
Technical Response Center fax: +1 503 526 4633  
Technical Response Center email: [support@pkinetics.com](mailto:support@pkinetics.com)

**[www.pkinetics.com](http://www.pkinetics.com)**

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The Photon Kinetics Product Warranty is as follows:

- 1) Photon Kinetics warrants all of its Products to be free from defects in materials and workmanship for a period of thirteen (13) months from the date of shipment from our factory. This warranty applies to all Products including fiber cleavers and other fiber preparation tools, but does not include any parts or components which are consumed, worn or otherwise degraded during the course of the normal operation of the Product. These excluded parts and components include, but are not limited to, the following: halogen lamps, fiber holders, cleaver blades, input/output lenses, ribbon cables, printer consumables, cable assemblies and any custom (special) components.
  - a) Our Responsibility - Photon Kinetics' sole responsibility under this Warranty shall be to either repair or replace, at Photon Kinetics' option, any covered Product or component of the Product that fails during the Warranty period because of a defect in workmanship or materials. All replaced Products or Product components shall become Photon Kinetics' property. Replacement Products or Product components may be reconditioned parts that fully meet applicable specifications. The Warranty for these replacement parts is ninety (90) days or the remainder of the Warranty period, whichever is longer.
  - b) Products Covered - The Warranty covers Products as delivered by Photon Kinetics to the customer, in unmodified condition. The customer understands that modification of any Product without Photon Kinetics' prior written consent shall invalidate the Warranty.
  - c) Customer's Responsibility - The Warranty set forth above is contingent upon proper treatment and use of the Product and on maintenance of a safe and suitable site. The Warranty does not apply to repair or replacement if the Product has been subjected to misuse, unauthorized modification, improper or inadequate installation, maintenance, accident, unusual physical or electrical stress, or unauthorized integration with other products not covered by Photon Kinetics' Warranty. The Warranty also does not apply to repairs or other support resulting from any customer modification of Photon Kinetics source code.
  - d) Other Limitations - The Warranty set forth above shall not be affected because of any technical advice, assistance, or service furnished by Photon Kinetics in connection with the Products. No obligation or liability shall arise from such assistance. The customer is not relying on Photon Kinetics' skill or judgment to select or furnish suitable Products for customer's purpose.
- 2) Photon Kinetics' Warranty to the customer shall be the standard Warranty for the Product which is in effect on the date of shipment to the customer.
- 3) THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR OBLIGATIONS, EXPRESS OR IMPLIED. SELLER EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PURPOSE. CUSTOMER AGREES THAT IN NO EVENT SHALL SELLER BE LIABLE FOR SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING LOSS OF PROFITS OR LOSS OF USE OR ANY OTHER ECONOMIC LOSS, WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY. THE REMEDIES PROVIDED HEREIN ARE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES.

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## UNPACKING INSTRUCTIONS

The FK11 Precision Fiber Cleaver is shipped in enclosed foam molded material in a cardboard box. This packaging should be retained and used whenever the cleaver is shipped.

## PACKAGING REMOVAL

The FK11 Precision Fiber Cleaver is shipped with an elastic band holding the blade mechanism in place. This should be carefully removed carefully before using the cleaver. Save the band in the event that the cleaver needs to be shipped in the future. The blade and the clamps should be cleaned with methanol or propanol before using the cleaver. Do not use aggressive solvents, such as acetone, for cleaning. The package also includes a screwdriver and a socket wrench to be used when making adjustments.

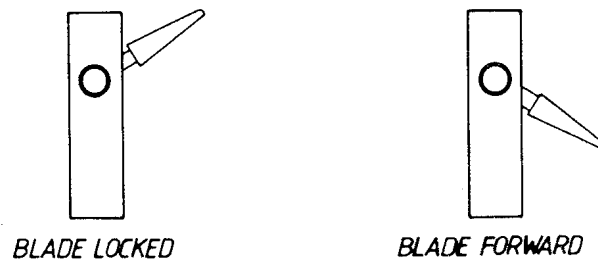


Figure 1: Blade Release Lever positions.

**WARNING: SET THE BLADE RELEASE LEVER (#1 IN FIG. 2) TO THE LOCKED (UP) POSITION (SHOWN IN FIGURE 1). ALWAYS LEAVE THIS LEVER IN THE LOCK POSITION WHEN THE FK11 IS NOT BEING USED.**

## BATTERY INSTALLATION

The FK11 Precision Fiber Cleaver requires a nine volt battery to power the piezo-electric transducer. One is supplied with each unit.

## FK11 FIBER CLEAVER SETTINGS

The FK11 Precision Fiber Cleaver has been preset to cleave standard fibers as follows:

- FK11, FK11-1, FK11-2, FK11-4: 125  $\mu\text{m}$  diameter, bare fiber
- FK11-LDF: 300  $\mu\text{m}$  diameter, pure silica fiber
- FK11-C: 125  $\mu\text{m}$  diameter, fiber coated with 250  $\mu\text{m}$  diameter acrylate

If fibers of substantially different outside diameter are to be cleaved, the dial indicator setting must be adjusted. This may occur prior to delivery if a sample of the fiber (a few meters) is forwarded to Photon Kinetics.

*Note: The range of diameters that can be cleaved are as follows: 80  $\mu\text{m}$  to 200  $\mu\text{m}$  for FK11, FK11-1, FK11-4; 180  $\mu\text{m}$  to 400  $\mu\text{m}$  for FK11-LDF; Please consult Photon Kinetics for FK11-C capabilities.*

## FK11, FK11-4, FK11-LDF CLEAVER OPERATION

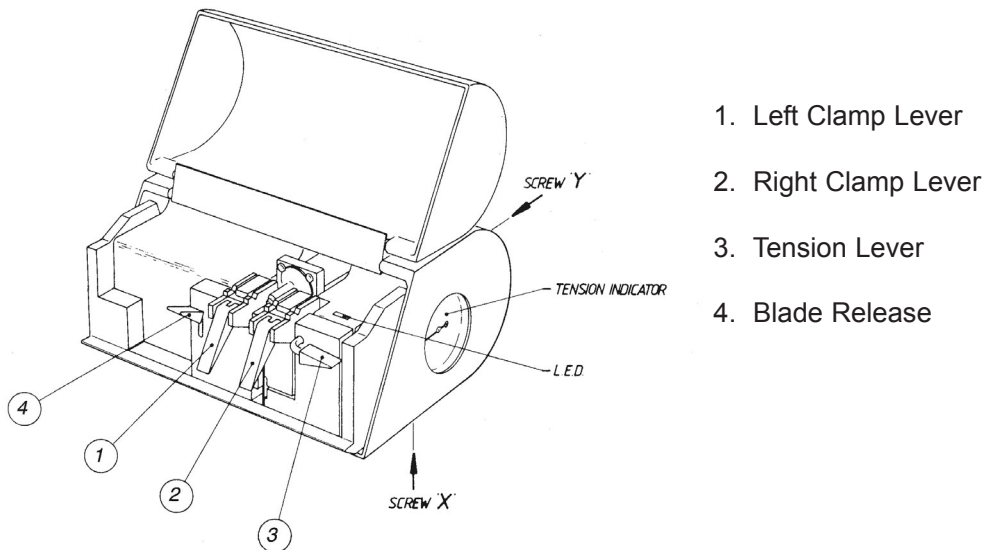


Figure 2: FK11, FK11-4, FK11-LDF Fiber Cleaver.

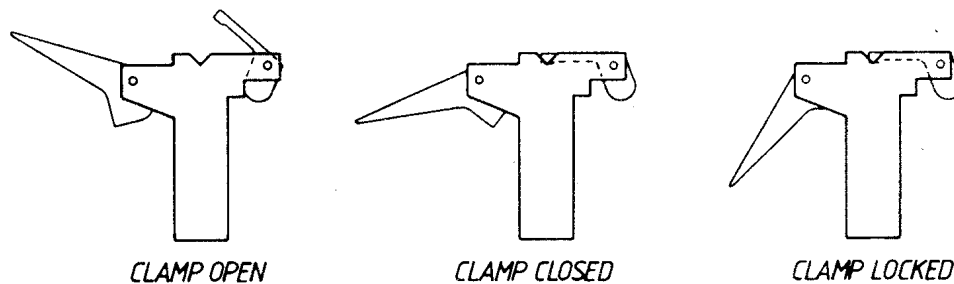
1. Clean all pads and the V-groove before using.
2. Prepare each fiber for cleaving by stripping all coating material over a length of 4.5 to 5 cm (1.75" to 2"). Clean exposed fiber using a suitable solvent. A good wetting with the solvent also helps to reduce static on the fiber. Allow the fiber to dry fully before attempting to cleave it.

**Note:** *Absolute cleanliness is vital to good cleaves. Failure to cleave can cause blade damage.*

3. Set all levers to the UP position. With the levers in these positions, the clamps are open, the blade is back in the START position, and the Tension Clamp to the READY position.
4. Place the prepared fiber into the grooves (insert fiber from the left side of cleaver). Make sure the clean fiber is well seated in both grooves.

**Note:** *The scale on the Left Clamp is to assist in cleaving at a specified distance from the end of the primary coating. It indicates distance from the diamond blade in millimeters. The scale is not fitted to the FK11-LDF or FK11-1.*

5. Lower the Right Clamp Lever (number 2 in Figure 2) to the CLOSED position (see Figure 3). Lower the Left Clamp Lever (number 1 in Figure 2) to the LOCKED position, thus clamping the fiber. The Right Clamp Lever should now be pressed fully down to the LOCKED position, clamping the free end of the fiber.



**Figure 3: Clamp Lever Positions**

6. Move the Tension Lever (number 3 in Figure 2) smoothly downward to the TENSION ON position (see Figure 4).

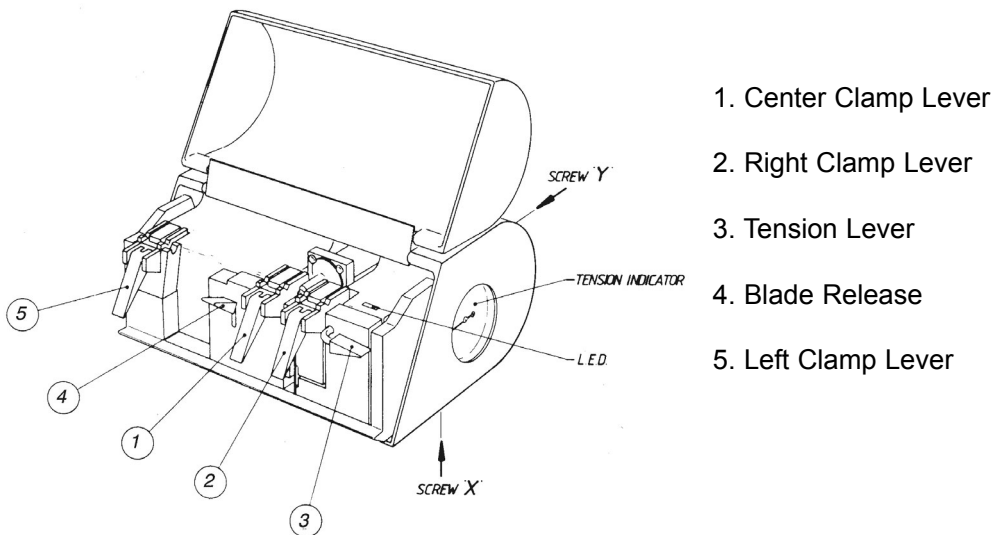


**Figure 4: Tension Lever Positions**

7. Move the Blade Release Lever smoothly down to release the blade mechanism and cleave the fiber. The green LED will glow for approximately three seconds to indicate that the blade is oscillating and the battery is in good condition.

8. Raise the Blade Release Lever to the LOCKED (UP) position, open the Left Clamp Lever and remove the cleaved fiber. Return all levers to their START (UP) positions, remove the off-cut and dispose of it safely.

## FK11-1 FIBER CLEAVER OPERATION



**Figure 5: FK11-1 Cleaver (For use with CH-1 and CH-2 fiber holders)**

1. Clean all pads and the V-groove before using.
2. Prepare each fiber for cleaving by stripping all coating material over a 100 mm (4") minimum length. Clean exposed fiber using a suitable solvent. Insert fiber into holder with a minimum of 30 mm (1.3") of bare fiber protruding beyond the end of the holder. Tighten the holder and reclean the protruding fiber. A good wetting with the solvent also helps to reduce static on the fiber. Allow the fiber to dry fully before attempting to cleave it.

**Note:** *Absolute cleanliness is vital to good cleaves. Failure to cleave the fiber can cause blade damage.*

3. Set all levers to the UP position. With the levers in these positions, the clamps are open, the blade is back in the START position, and the Tension Clamp is in the READY position.
4. Place the fiber holder into the Center clamp (number 1 in Figure 5). Make sure the shoulder of the holder is firmly held against the clamping pad.
5. Lower the Left Clamp Lever to the fully LOCKED position.
6. Position the fiber through the Left Clamp (number 5 in Figure 5), making sure that the fiber rests on the clamp pad. Lower the Clamp Lever to the fully LOCKED position.
7. With the free end of the fiber in the V-groove in the Right Clamp, lower the Right Clamp to the fully LOCKED position.
8. Move the Tension Lever (number 3 in Figure 5) smoothly downward to the TENSION ON position (for reference, see Figure 4).
9. Move the Blade Release Lever smoothly down to release the blade mechanism and cleave the fiber. The green LED will glow for approximately three seconds to indicate that the blade is oscillating and the battery is in good condition.
10. Raise the Blade Release Lever to the LOCKED (UP) position. Open the left Clamp Lever and then open the center Clamp Lever and remove the fiber holder. Return all levers to their START positions (UP), ready for the next cleave. Remove the off-cut and dispose of it safely.

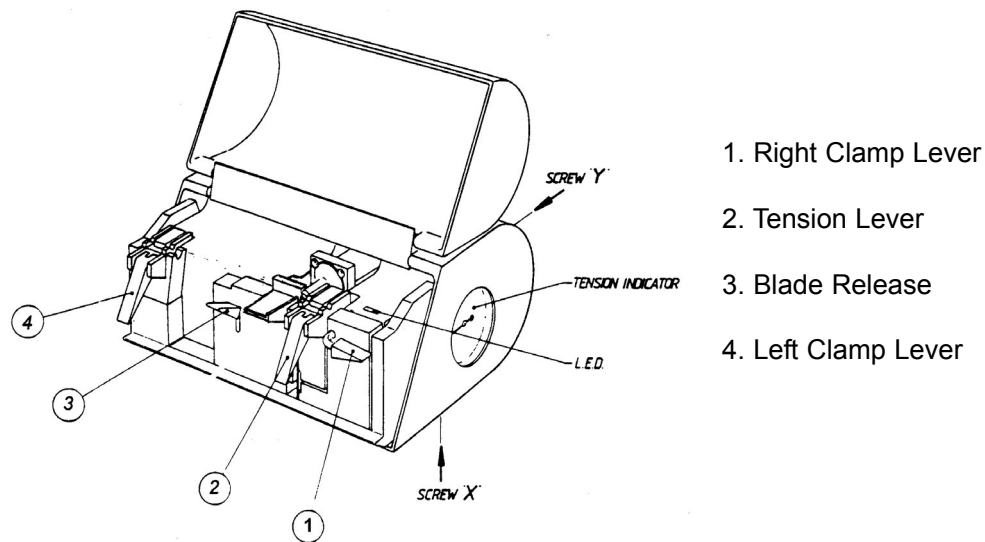


## FK11-C COATING CLEAVER OPERATION

1. Clean all pads and the V-groove before using.
2. Prepare each coated fiber for cleaving by cleaning with a suitable solvent that will not be absorbed by the fiber coating. A good wetting with the solvent also helps to reduce static on the fiber. Allow the fiber to dry fully before attempting to cleave.
3. Set all levers to the UP position. With the levers in these positions, the clamps are open, the blade is back in the START position, and the Tension Clamp to the READY position.
4. Place the fiber into the grooves (insert the fiber from the left side of the cleaver).
5. Gently lower each of the clamps to the CLOSED position (clamp lever positions are shown in Figure 3) to hold the fiber lightly.
6. Then lower the middle Clamp Lever to the fully LOCKED position.
7. Lower the left Clamp Lever to the fully LOCKED position.
8. Lower the right Clamp Lever to the fully LOCKED position.
9. Move the Tension Lever smoothly downward to the TENSION ON position.
10. Move the Blade Release Lever smoothly down to release the blade mechanism and cleave the fiber. The green LED will glow for approximately three seconds to indicate that the blade is oscillating and the battery is in good condition.
11. Raise the Blade Release Lever to the LOCKED (UP) position. Open the left Clamp Lever and the middle Clamp Lever and remove the cleaved fiber. Return all levers to their START positions, ready for the next cleave. Remove the off-cut and dispose of it safely.

**Note:** Make sure that the portion of the fiber being clamped and that the portion of the fiber being cleaved has not been previously clamped. Clamping tends to distort the fiber which may lead to torsion being introduced and poor cleaves.

## CLEAVING WITH THE UNIVERSAL HOLDER



**Figure 6: Universal Fiber Holder Option**

1. Clean all pads and the V-groove before using.

2. Prepare each fiber for cleaving by stripping all coating material over a minimum length of 4 cm (1.5 - 1.6"). Clean exposed fiber using a suitable solvent. A good wetting with the solvent also helps to reduce static on the fiber. Allow the fiber to fully dry before attempting to cleave it.

3. Hold the fiber holder between the thumb and first finger of the right hand with the engraved arrow side uppermost. Open the fiber holder by squeezing the smaller face below the pivot (the large V-groove). Lay the coated fiber onto the pins that are now exposed. The end of the coating should be positioned approximately 5 mm (.19") beyond the right-hand edge of the holder. Release the pressure on the holder and pull fiber through until the end of the coating is flush with the right hand edge.

4. Set all levers to the UP position. With the levers in these positions, the clamps are open, the blade is back in the START position and the Tension clamp is in the READY position.

5. Place the holder on to the platform to the left of the diamond blade with the engraved arrow side uppermost and magnetic insert against the back face of the platform. Make sure the holder is fully to the right and the bare fiber lays in the V-groove of the moving clamp to the right of the diamond blade.

6. Position the fiber through the left Clamp. Make sure that the fiber rests on the clamp pad. Lower the left Clamp Lever to the fully LOCKED position.

7. With the free end of the fiber in the V-groove in the right Clamp, lower the right Clamp Lever to the fully LOCKED position.
8. Move the Tension Lever smoothly downward to the TENSION ON position (shown in Figure 4).
9. Move the Blade Release Lever smoothly down to release the blade mechanism and cleave the fiber. The green LED will glow for approximately three seconds to indicate that the blade is oscillating and the battery is in good condition.
10. Raise the Blade Release Lever to the LOCKED (UP) position. Open the left Clamp Lever and remove the fiber holder. Return all levers to their START positions (UP), ready for the next cleave. Remove the off-cut and dispose of it safely.

## TROUBLESHOOTING

*Note: Absolute cleanliness is vital to good cleaves. Failure to cleave can cause blade damage.*

Problem	Symptom
Fiber has not been cleaned properly	This may cause accumulation of dirt and debris on the blade edge or the clamp surfaces. Clamp surfaces should be cleaned with methanol and a cotton-tipped stick. While still wet, lower the Blade Release Lever and allow the blade to vibrate. This action will clean the blade. A dirty blade usually leads to a failure to cleave. Dirty clamps can lead to bad end angle or a break under the clamp face.
Blade has been damaged	Damage to the fiber end where the blade was in contact, a bad end angle, or failure to cleave may all be indicators of a damaged blade. Adjust the blade position to utilize an undamaged part of the blade (See Blade Adjustment section).
Incorrect tension	Too much tension is indicated by "hackle" on the cleaved face. Too little tension leads to failure to cleave. Tension may be adjusted by following the steps outlined in the next section.
Slipping clamp	This generally leads to failure to cleave and means the clamp faces or the fiber need cleaning.

## ADJUSTMENTS

### TENSIONER FOR THE FK11, FK11-1, FK11-4, FK11-C

The tensioner is used to apply tension to the fiber before it is cleaved. Normal setting of this tensioner is 200 for 125  $\mu\text{m}$  diameter fibers. Larger fibers may require more tension.

To change the setting, raise the Tension Levers to the TENSION OFF (UP) position, and using a 2 mm (1/16") screwdriver, turn the adjuster screw (screw x, shown in Figure 2) clockwise to increase the tension, or vice versa. This screw is accessible through the hole in the bottom of the case.

### TENSIONER FOR THE FK11-LDF

The tensioner is used to apply tension to the fiber before it is cleaved and is assisted by a secondary non-adjustable spring. Normal setting of this tensioner is 440 for 300  $\mu\text{m}$  diameter pure silica fiber. Larger fibers may require more tension. To change the setting, refer to the instructions above.

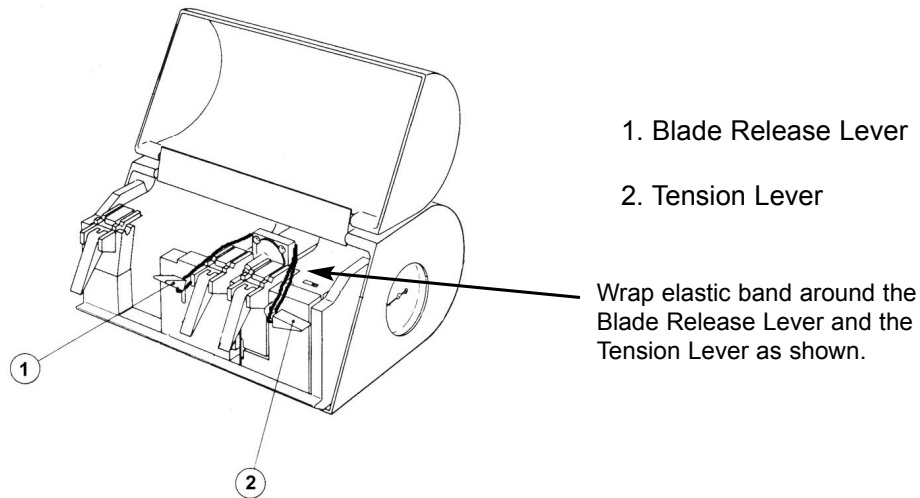
***Note:** If correct tension is not known, it is best to start with a high tension to ensure a cleave and then gradually reduce it until a satisfactory cleave is obtained. Blade damage caused by failure to cleave may be avoided this way.*

### BLADE ADJUSTMENT

The diamond blade may become worn after many cleaves. When this occurs the blade should be raised to a new position. Using a 2 mm (1/16") hex wrench, turn the adjuster screw Y (shown in Figure 2) clockwise one quarter turn. This screw is accessible through the hole in the rear of the case. Proceed cautiously as the blade cannot be lowered once it has been raised.

## RETURNING CLEAVERS FOR SERVICE OR REPAIR

If you need to return your FK11 Ultrasonic Fiber Cleaver for service, return the unit in its original shipping carton. Replace the elastic band to hold the cleaver blade in place during transit. See figure below for detail. Inadequate packaging can lead to serious damage and may invalidate any warranty. If you do not have the original elastic band, please use a size 19, 3 1/2 x 1/16" band as a replacement.



Before returning the cleaver, you must obtain a Return Materials Authorization (RMA) number. To obtain an RMA number, please have your model number and serial number available, and call +1 503 526 4678 or send an email to [support@pkinetics.com](mailto:support@pkinetics.com). All cleavers should be returned to the following address:

**Photon Kinetics, Inc.**  
**Attn: RMA # [enter your RMA # here]**  
**9305 SW Gemini Drive**  
**Beaverton, OR 97008**

Please include the following with your shipment:

- Return Materials Authorization (RMA) number.
- Model number and serial number.
- Your name, address, phone number, fax number and email address.
- Address to which the cleaver should be returned.
- Details of the problem.
- A purchase order for repair charges (not necessary for warranty repairs).
- Shipping instructions for return of the cleaver. If no shipping instructions are received, shipping arrangements will be made by Photon Kinetics and charged to the customer.

Photon Kinetics, Inc.  
9305 SW Gemini Drive  
Beaverton, OR 97008  
USA



### EC Declaration of Conformity

We,

Photon Kinetics, Inc.  
9305 SW Gemini Drive  
Beaverton, Oregon 97008-7160  
USA

declare under our sole responsibility that the

### FK11 Fiber Cleaver and its Variants

to which this declaration relates is in conformity with the following standards or other normative document(s):

Following the provisions of Directive 89/336/EEC for Electromagnetic Compatibility:

IEC 61326-1:	1997 Emissions
IEC 61326-1:	1997 Immunity
EN 61000-3-2:	Current Harmonics Test
EN 61000-3-3:	Voltage Fluctuation and Flicker Test

Due to the nature of the equipment and the low power operation, it is deemed unnecessary to apply testing to verify compliance. Product variants include, but are not limited to, the following models:- FK11, FK11-1, FK11-2, FK11-4, FK11-6, FK11-LDF, FK11-C, FK11-6C, EFC11, EFC11-4, EFC11-PM, FK12, FK11-PK-C, EFC11-S33, 1100-YCL (previously known as the FK11-SFA) and 2xxx-YCL (previously known as the FK11-PK).

Beaverton, Oregon, USA

06 May 2005  
Date

Francis Sladen  
Vice President, Engineering  
Photon Kinetics, Inc.

tel +1 503 644 1960  
fax +1 503 526 4700

[www.pkinetics.com](http://www.pkinetics.com)

97-0674-00  
Rev. H

## RoHS Certificate of Compliance

EC directive 2002/95/EC restricting the use of certain hazardous substances (the RoHS Directive) restricts the use of the following hazardous substances in electrical and electronic equipment: Cadmium, Lead, Mercury, Hexavalent Chromium, Polybrominated Biphenyls, Polybrominated Diphenyl Ethers.

Based on information provided by our suppliers Photon Kinetics designates the product listed below as **RoHS compliant** when manufactured after the date specified on this certificate.

RoHS compliant means that:

- Our suppliers have confirmed the compliance status of the components and materials incorporated into this product.
- We have built the product in isolation from non-compliant products.
- We have introduced new part numbers for all compliant components and materials to identify and segregate compliant components and materials from non-compliant components and materials.

Confirmation of the compliance status of components and materials by our suppliers is either because the products do not contain any of the restricted substances referred to in Article 4(1) of the RoHS Directive at concentrations in excess of those permitted under the RoHS Directive, or because removal of the restricted substances is not technically possible and their existence in the products at levels in excess of these concentrations is allowed as one of the particular applications listed in the Annex to the RoHS Directive, or because they have been granted exemption under one of the amendments to the RoHS Directive, or because the products fall outside of the scope of the RoHS Directive.

For these purposes, the maximum concentration values of the restricted substances, by weight, in homogenous materials are:

Cadmium	0.01%
Lead	0.1%
Mercury	0.1%
Hexavalent Chromium	0.1%
Polybrominated Biphenyls (PBB's)	0.1%
Polybrominated Diphenyl Ethers (PBDE's)	0.1%

The product(s) covered by this RoHS Certificate of Compliance are as follows:-

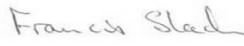
Description: FK11/FK12-Series Optical Fiber Cleavers and their variants, replacement parts, spares and consumables.

Photon Kinetics Part Number(s): Part numbers xx-xxxx-xxG ( "G" suffix denotes RoHS compliance ).

Date of Compliance: Products manufactured January 2011 and thereafter. Note all products with part numbers ending with a "G" suffix manufactured prior to January 2011 are also compliant.

Beaverton, Oregon, USA

28 January 2011



Francis Sladen  
Vice President, Engineering  
Photon Kinetics, Inc.

**Note:** Not all FK Series Cleavers are RoHS compliant. Only those cleavers that are explicitly quoted and purchased as being RoHS compliant will meet the specifications in the certificate above.