

The CleanSpot

A PCR/UV WORK STATION



- ➔ Controls PCR Contamination
- ➔ Cycle Sequencing Setup

Just 25-30 minutes of UV irradiation in the COY CleanSpot can prevent unwanted PCR contamination. The CleanSpot is the easiest and most economical method for DNA (RNA) purification.

The CleanSpot is designed to prevent unwanted contaminant DNA in amplification mixtures, saving hours of work and expensive samples. The combination of a special light reflector and two powerful overhead UV bulbs generates pyrimidine dimers and other photo defects in contaminating target sequences, thus eliminating falsely primed products that result in lost time and expense.

The enclosure provides a contained, dead air space in which to set up your reactions and permit safe 254 nm UV irradiation of solutions and supplies. This powerful UV wavelength renders DNA contaminants biologically inactive in 30 minutes or less.

The 3/8-inch-thick front panel acts as a breath guard. An overhead fluorescent light illuminates the work area.

Detailed Description

DNA sequences often contaminate reagents, buffers, equipment, tubes and tips commonly used for PCR* reactions, resulting in needless lost time and expense.

For years it has been known that UV light can damage DNA. UV exposure of 30 minutes or less in the CleanSpot PCR Workstation can prevent unwanted amplification of contaminant DNA. The combination of unique reflectors and powerful overhead UV lights introduces pyrimidine dimers and other photodamage into the contaminating target sequences, making them non-amplifiable.

The amplification process produces large quantities of DNA that are handled at various analysis stations; even laboratories using extreme care in handling the samples will have the product permeate throughout the lab. One copy of this product DNA or other extraneous DNA in an experimental reaction mixture can be amplified, leading to false positives or erroneous results.

This contaminant DNA is typically introduced during reaction setup and carried into the mixture by:

- contaminated tubes, tips and/or pipettes
- airborne particles laden with DNA
- fouled reaction components

The PCR Workstation is designed to combat the three major contaminant pathways. Reaction preparation and equipment/supply storage are performed in the "clean," enclosed, still air chamber, thus minimizing airborne and supply borne contamination. During reaction preparation, part of the reaction mix is exposed to the UV light, thus decontaminating any fouled reaction components. Since this exposure bathes the chamber and its contents, they are "cleaned" at the same time. By keeping the doors latched, the enclosed chamber and supplies are ready for the next use.

*PCR (polymerase chain reaction) is covered by patents held by Hoffman-LaRouche.

MULTIPLE ITEM IRRADIATION

Large enclosed work area permits continuous irradiation of many items simultaneously.

WHITE LIGHT ILLUMINATION

Overhead white light illuminates the work area for non-UV light applications.

ELIMINATES FALSELY PRIMED PRODUCTS IN 30 MINUTES OR LESS

The shelf can be used as an exposure area to reduce decontamination time.

REDUCED OPERATOR EXPOSURE TO UV

Safety device switches off the lamps, preventing user exposure inside the chamber. The enclosure absorbs UV light for added safety.

ISOLATING ENVIRONMENT

The enclosed benchtop work area provides a convenient, "clean," still air environment in which to set up reactions.

EASY TO INSTALL AND CLEAN

The chamber breaks down into four component parts without the use of tools.

MORE EFFECTIVE IRRADIATION OF REACTION MIXTURES, REAGENTS AND SUPPLIES

Unique light reflector allows all UV light to be directed to the work area, providing more effective irradiation of reaction mixtures, reagents, pipette tips and pipettors.

ADVANTAGES OVER OTHER METHODS

In addition to enjoying cost advantages over laminar hoods, TheCleanSpot can have performance benefits due to the enclosed work area and UV lights. The UV light process prevents decontamination while leaving the amplified DNA intact whereas chemical decontamination methods can modify amplified DNA. The isolated "clean" setup area is missing when trans-illuminators or cross linkers are used as radiation sources. Also, these light sources may not emit light at a high enough intensity or at the proper wavelength to efficiently inactivate the contaminant DNA.

Performance Information

A. PURE TARGET

100% of sequences can be amplified. 10 ng of a previous PCR product resuspended in 4 ul of distilled H₂O were allocated into a series of tubes. All tubes were run through UV light irradiation and one tube was removed every 10 minutes. Each tube was then cycled through 30 rounds of PCR using primers specific to the material PCR and 10 ul of each reaction was run on an agarose gel. Tubes were on their sides and capped.

B. HUMAN GENOMIC DNA TARGET

1. Repetitive sequence DNA primers were used on total genomic DNA which was irradiated over a time course of 10 to 30 minutes, and each tube was cycled through 30 rounds of PCR using repetitive DNA primers. 10 ul of amplified DNA was run on an agarose gel. Twenty minutes of irradiation was required to deactivate 20 ng of target. Tubes were on their sides and capped.

2. 50 ng of total human DNA resuspended in 4 ul of distilled H₂O was irradiated over a time course of 10 to 30 minutes. Each tube was cycled through 30 rounds of PCR using a primer set specific for a single gene. Twenty minutes completely deactivated the template.

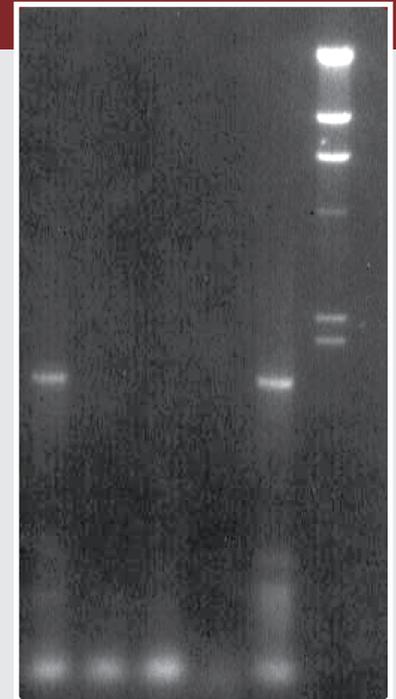
The irradiation times given in A and B above can be reduced by placing the items to be decontaminated on the shelf in the chamber. Since the light is about two times more intense on the shelf, the time required to deliver the same amount of energy to the items is 1/2 that at the chamber base where tests A and B were done.

Suggested irradiation times take into account the intensity of the UV lights and the natural decay in this intensity over time. A decrease of 20 percent in intensity is seen after 1500 hours of continuous operation. Since this decay is accelerated by switching the bulbs on and off, we suggest changing the bulbs every year.

Current users are finding the CleanSpot very useful in eliminating contamination problems in labs where amplification of the same gene has been done for a long time.

Inactivation of Target DNA by UV Radiation

10 ng of a 1.5 kb fragment was exposed to UV irradiation for 0, 10, 20 and 30 minutes (lanes 5, 1, 2, 3), then amplified for 30 cycles. Lane 4 shows primer in absence of other reaction components. Lane 6 is lambda DNA cleaved with Hind III.



1 2 3 4 5 6

Technical Specifications

DIMENSION

24" L x 18" D x 28" H (609 mm x 457 mm x 711 mm)

WEIGHT

31 pounds (16 kg)

LIGHT SOURCE

2 UV bulbs (254 nm white fluorescent)

ELECTRICAL

110 V or 220 V available

WARRANTY

Six months

SAFETY DEVICE

Reed switch prevents operation of UV lamps when doors are open

PART

8000-006 (110 V)

8000-025 (220 V)



Reports Concerning UV Irradiation and/or Containment to Minimize Carry-Over Contamination in DNA Amplification

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- Fairfax, M.R., Metcalf, M.A. and Cone, R.W., **Slow Inactivation of Dry PCR Templates by UV light.**
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Nature. Vol. 344:201, March 15, 1990.
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In *Photochemical and Photobiological News*, Vol. 4 (ed. Smith, K.C.) pp. 267-330. Plenum Press, New York, 1979.



Sales Representative

