Exempt Use Products Tracking Sheet Bruce

This form is to used on all SSD and Licensing cases involving 10 CFR 32.22 (self-luminous products) and 32.26 products (gas and aerosol detectors). The SSD acceptance reviewer or the License reviewer should initiate this form. An electronic copy is on the S: and H: drive (directories EXEMPT and SSDFILE), named EXEMPT PRODUCT COORD.WPD. Due to the need to coordinate these cases between both groups, efforts should be made to complete each review as quickly as possible. SSD Reviewers should note that the licensing due date may be 90 days. If more than one RAI is required, repeat steps 3-5. All packages should stay on desktop in accessible location, while RAI is out.

Date of application: January 24, 2003 Date received: February 4, 2003

Applicant: Unertl Optical Company, Inc.

SSD Case #: 03-19 License #: New

SSD Due Date: August 1, 2003 *(180 days)* Licensing Due Date: _____ *(90 or 180 days)*

SSD Reviewer 1: John Jankovich Docket #: _____

SSD Reviewer 2: Ujagar Bhachu Mail Control # _____

License Reviewer: Bruce Carrico

SSD Registration certificate #: New

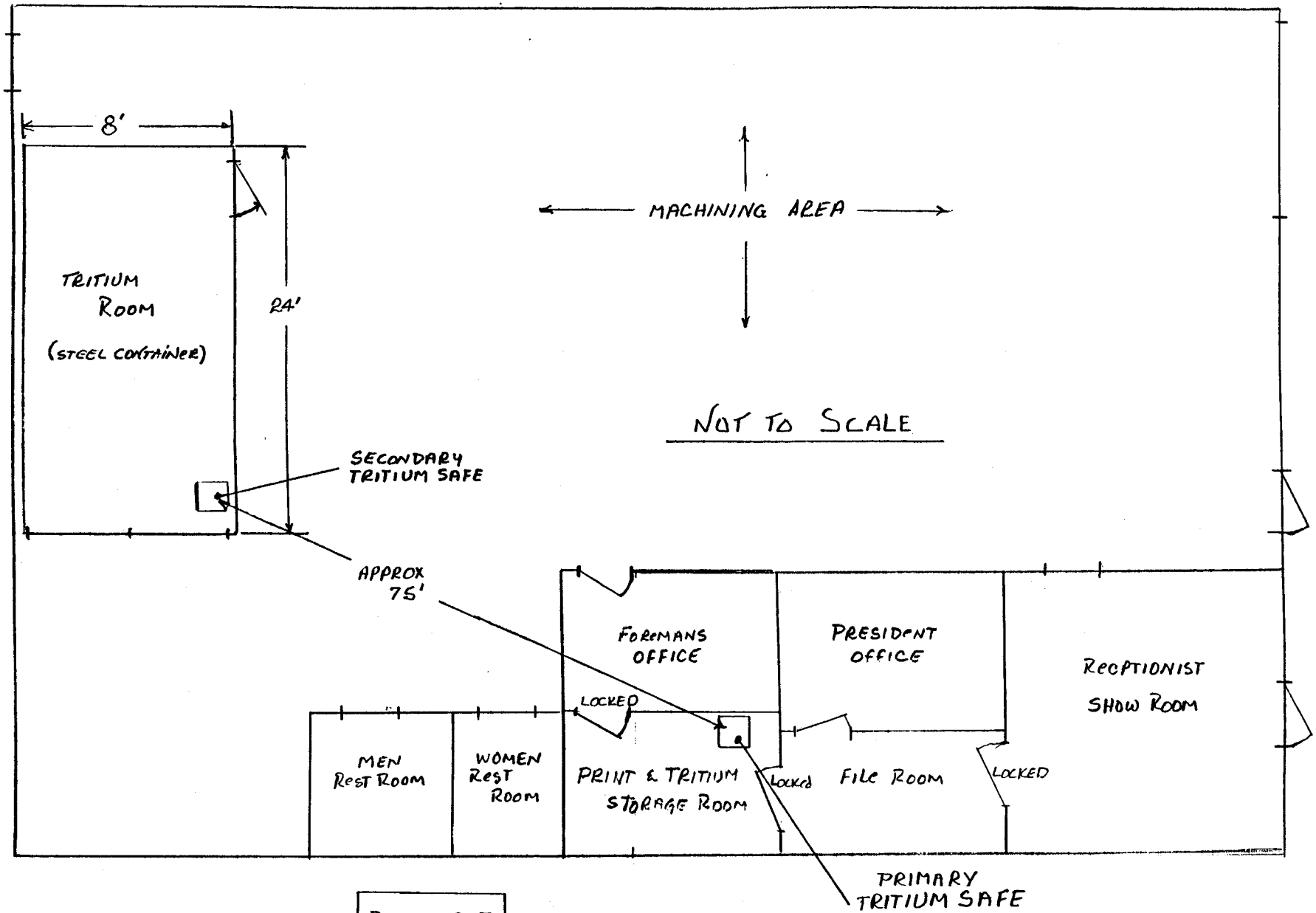
ADAMS Accession #: ML_____

(initials & date)

JK 9/4/2003	1.	Determine that the case involves 32.22 or 32.26 products. If not then do not use this form. If yes, make a copy of the form and place in Traci's box.
_____	2.	Review by incoming review group. Fill in the case information above. Generate SSD or License. Generate outgoing with second review group on concurrence. Forward package to second review group.
Skip to Step 6 if no RAI.		
_____	3.	Initial review by second review group. Fill in the case information above. Generate SSD or License. Retain a copy of this sheet for reference. Provide comments for outgoing to incoming review group. Return package to assigned Reviewer from incoming review group.
_____	4.	RAI#1 distributed by incoming review group.
_____	5.	RAI#1 response reviewed by incoming review group. Generate outgoing with second review group on concurrence.
_____	6.	Review by second review group. Provide comments for outgoing completion letter to initial review group.
_____	7.	Completed cases distributed.
_____	8.	Put package in ADAMS. Reviewer for Incoming review group responsible for getting background materials and outgoing into ADAMS (with assistance from Reviewer from second review group, as necessary). Put SSD or License in ADAMS, as applicable. Forward document location information to Reviewer from second review group.
_____	9.	Second review group complete ADAMS filing for your case. Put SSD or License in ADAMS, as applicable.

UNERTL OPTICAL CO. INC.
2900 S. HIGHLAND DR. BLDG 18-C
LAS VEGAS, NEVADA 89109

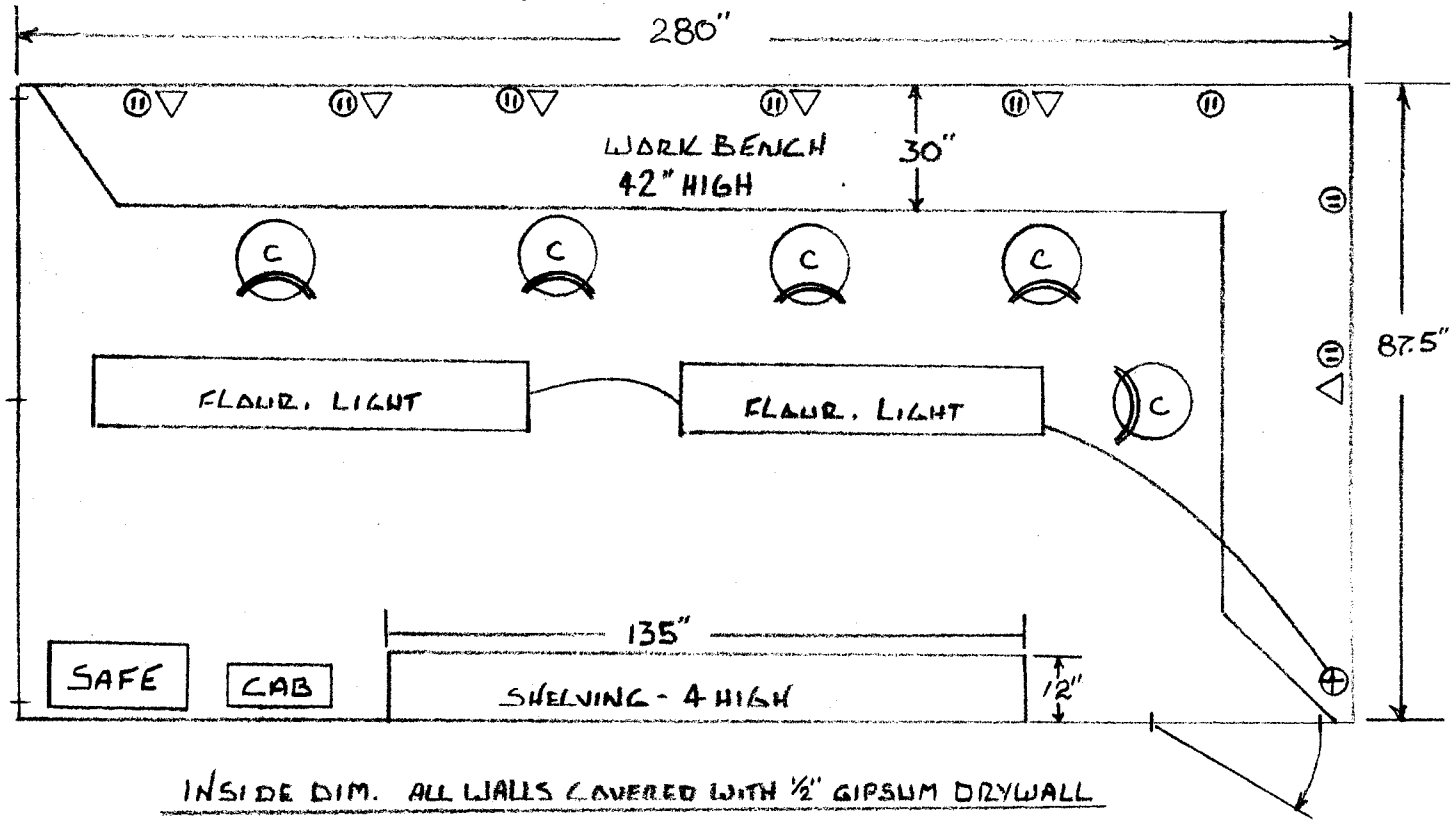
BLDG 18-D



BLDG. 18-B

DWG. BY AL LING
JAN. 17, 2003

⊕ – LIGHT SWITCH
▽ – COMPRESSED AIR OUTLETS FOR LOCTITE MACHINES
⓫ – 115VAC 15A ELECTRICAL OUTLETS



INSIDE DIM. ALL WALLS COVERED WITH ½" GIPSUM DRYWALL

SELF CONTAINED - STEEL CONTAINER - 8' WIDE 8'6" TALL 24' LONG

UNERTL Optical Company, Inc.

REVISIONS AND REFERENCE DRAWINGS	TOLERANCES
	FRACT.
	DEC.
	ANG.
	UNLESS NOTED

TRITIUM ROOM

DRAWN	AL LING	DATE	JAN. 17 2003
CHECKED		SCALE	NONE
APPROVED		DWG.	A

ANSNE A.P. SMITH CO. PCH. PA

PR 843–751

QUALITY CONTROL PROCEDURES

PERSONNEL

An employee file is kept on all employees. This file consists of a brief biographical sketch, level of education attained, special schools, experience, performance appraisals and evaluations. All upper management have a resume on file. We are in the process of writing job descriptions for all positions. The training of new personnel will be performed during the first day orientation. We have incorporated an employee training form for documentation purposes. The personnel file contains any medical records that affect the employee's job performance.

EQUIPMENT

The equipment and instrumentation used for measuring, testing and inspecting includes, but is not limited to, the following micrometers, dial calipers, and plug gages. This equipment is utilized to verify dimensional tolerances that are maintained throughout the production process. All micrometers and calipers are calibrated against a one-inch industry "standard". The calipers and micrometers are then adjusted to read one inch. The plug gages are measured against the already calibrated micrometers. The "standard" will be sent yearly to the National Institute of Standards and Technology dimensional acceptance.

MATERIAL AND SERVICE PROCUREMENT

All sealed sources will undergo a one hundred percent operational check before installation. All sealed sources will first be inventoried manually and inspected for activity. Measuring the outside diameters to ensure that dimensional tolerances are maintained will be the next operational check. The overall length will then be measured for quality assurance purposes. Each sealed source will be optically inspected for staining, minute cracks, or other abnormalities that could be encountered. A one hundred percent operational check will be performed several times by several different personnel at different stages to ensure design specification criteria will be strictly adhered to.

INVENTORY

When a shipment is received, the canister will be opened in the presence of at least two people to begin the initial inventory process. The shipping document will be removed and four photocopies will be made of the original. The original will be placed in the file with a copy being sent to the Shipping Department, Accounting Department, and one being kept with the shipment itself. A minimum of two people will then began the process of counting each sealed source to match the quantity on the shipping document.

A shortage or excess of sealed sources will be then indicated in the file and the manufacturer immediately notified.

A second inventory/inspection will then be immediately performed on the shipment. The purpose of this inventory/inspection is to ascertain the activity of all sealed sources. If sources are found that do not emit light, they will be immediately placed back in the container in which they were initially shipped. These sources that are found to be inactive during this inventory/inspection process are segregated and placed in a vault for shipment back to the manufacturer.

At this point, two complete inventories will have been performed along with an initial quality control procedure. The first inventory will verify that the count on the shipping document matched what was, in fact, received. The second inventory, performed in a dark room, will verify the activity of all sealed sources, which will be the first step in the quality control program. The data gathered in the performance of these two inventories will then be placed on file for future record.

PRODUCTION PROCEDURES AND PROCESSES

Unertl Optical Company, Inc. will not repair or rework non-conforming sealed sources. Non-conforming sources will be identified during the initial inventory and inspection process. If a non-conforming source should be found, it will be segregated and marked for shipment back to the manufacturer. Testing, inspection, and distribution procedure are covered elsewhere in this document.

INSPECTION AND TESTING

Each sealed source will be subjected to an operational check and a one hundred percent inspection several times by numerous personnel throughout the manufacturing process and before distribution. Initial inventory and inspection will identify non-conforming materials. Each sealed source will be measured for dimensional correctness. The housings/sights will also be measured to ensure that the tolerances are maintained. After the sealed sources are installed in the housings/sights, the housings/sights will also be measured to ensure that all tolerances are maintained. After source installation, the housings/sights will be cured for a twenty-four hour period to ensure proper adhesive bonding. Before packaging, all housings/sights will undergo a one hundred percent operational check for illumination and fit. At this point, the product will be packaged and ready for shipment. Prior to shipping, all housing/sights will be visually inspected for illumination and fit one last time.

MATERIALS NON-CONFORMING

All non-conforming materials shall be segregated and shipped back to the manufacturer. Non-conforming materials will be identified upon initial inventory and inspection. For our purposes, a non-conforming material would be one that is not illuminating, dimensionally incorrect, stained, cracked or in any other way misshaped or deformed. The first step in our quality control program will identify all non-conforming materials by visual inspection and measurement. The continuous and ongoing inspection procedures will ensure quality control and safety throughout the entire process.

PACKAGING AND TRANSPORTATION

All products that will leave the facility will be packaged either in a plastic bag or in a clear clamshell plastic container, surrounded with appropriate cushioning material. A picture of the product may be attached and the following information will be included in each package: A warranty card that must be filled out by the purchaser; maintenance and installation instructions, and product and company information. All products leaving the facility will be entered into our computer shipping/tracking system. Records will be maintained of all products shipped, the date shipped and their destination.

DEVIATIONS AND CUSTOMER COMPLAINTS

A complaint received due to a device failure will be addressed and evaluated by Quality Control. Warranty cards will be issued to original purchasers. The information included on the card will contain the name of the purchaser, address, phone number, date of purchase, type of device, and the model number. Each complaint will be handled on an individual basis to determine if there was, in fact, a device failure, and, if so, the root cause of the failure. Quality Control will analyze any device failure through inspection and evaluation of the returned item. Trend analysis shall be performed yearly on all deviations, unless circumstances warrant more frequent analysis. Computerized recorded files will track all deviations based on warranty card issuance at the time of purchase. If it is determined that a failure or deviation is a result of generic design flaws or manufacturing problems, all known users having the same device shall be notified. If it is ultimately determined that a failure or deviation is a result of any generic design flaw or manufacturing problem, Nuclear Regulatory Commission notification will be prompt.

AUDITS

Internal audits shall be conducted, at a minimum yearly basis. The Accounting Department shall conduct such internal audits. Accounting shall audit all areas based on established written procedures. These audits will be conducted and based on written procedures governing all aspects of manufacturing and quality control. All phases of production from incoming source inventories through fabrication and manufacturing to

outgoing product shall be scrutinized by the Accounting Department. The Accounting Department has no responsibility for, nor is accountable to, the Quality Control Department and is therefore best suited to perform the internal audit and evaluation. After the evaluation process, the Accounting Department will issue to Quality Control the results of the audit. All findings, including discrepancies, deficiencies and corrective actions, will be maintained on computer files. If any discrepancies or deficiencies are encountered, a subsequent audit will be performed within thirty days to clarify any discrepancies and to ensure corrective measures have been taken. The completed audit shall include the signature of the auditing official, date of audit, any discrepancies or deficiencies (if applicable) and any and all corrective actions (if applicable). All audits shall be kept on computer file indefinitely.

INVENTORY SHEETS

All inventory sheets and work logs will be kept in the tritium and office safes. The safes will be locked at night and during the day they will only be opened by the Facility Manager, Quality Control Supervisor, and Tritium Room Supervisor. All weapons and sealed sources will be secured and locked in a safe every night. The safes will be opened again in the morning, as necessary.

RECORDS AND DOCUMENTATION

Records of all testing procedures, inventories, or any other procedural requirement that Quality Control deems appropriate and necessary shall be maintained indefinitely. Logs shall be kept verifying inspections, inventories and audits. After sealed source installation, a warranty card will be kept on file (issued to original purchaser) to ensure that a consistent and thorough tracing system is maintained. The Quality Control Supervisor shall perform random inspection of documentation on a semi-annual basis, or more frequently as he deems necessary and appropriate. Inventories, inspections, and shipping logs shall all be computerized for ease of access.

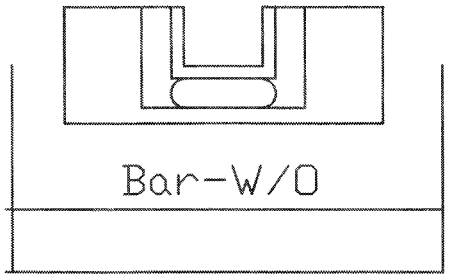
ALARM AND SAFE PROCEDURES

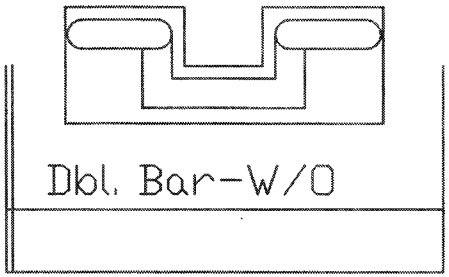
There are two Underwriters Laboratory fire-resistant, combination security safes on the premises. One is in the front office, and the other one in the tritium room. The safe in the front office holds the overflow of tritium, tritium that has been received and inventoried, and tritium that has been received but did not meet minimum standards and will be returned to the manufacturer. The safe in the tritium room will hold all tritium that will be utilized for gun sights in process, as well as all guns and slides that remain on the premises overnight. All safes are maintained behind multiple locked doors, within a locked building that has a night watchman.

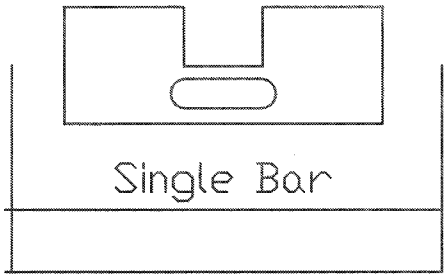
The front safe will be locked and checked every night by the Facility Manager or Quality Control Supervisor. These will be the only people that will have the combination to this safe.

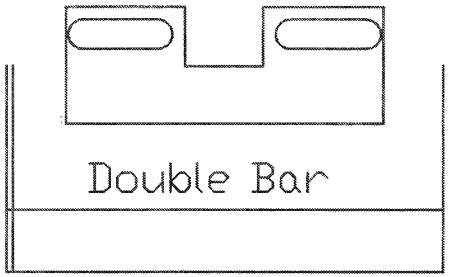
The tritium room safe will be locked by the tritium supervisor of the day and checked by the Facility Manager or Quality Control Supervisor. All tritium in this room will be secured in this safe every night. No tritium will be left out under any circumstances. The only people to have this combination will be the Tritium Room Supervisor, Facility Manager, or Quality Control Supervisor

The building has an alarm system installed and active. The people who have keys and alarm codes are supervisors only. The alarm system has a check system whereby we can ask for a readout of who has come in and out of the building at all times. No hourly non-management personnel have keys or alarm codes.



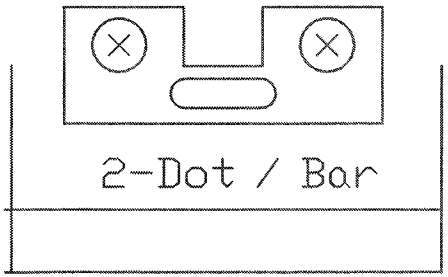


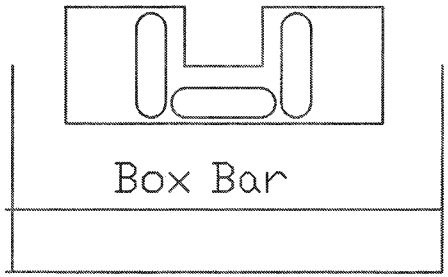


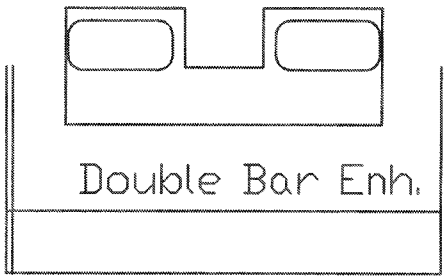


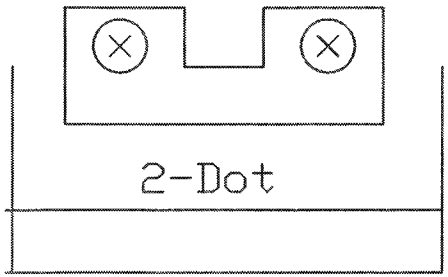
ISSUE	REVISION	DATE	BY	CHK'D

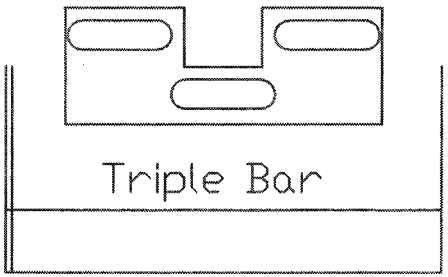
DRAWN D.J.F.	UNERTL OPTICAL Co.	
DATE		
CHK'D		
APPR.	TITLE Tritium Configurations	
DATE		
SYSTEM		
SCALE	SIZE	DRWG NO.

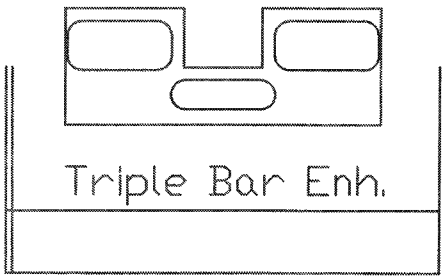






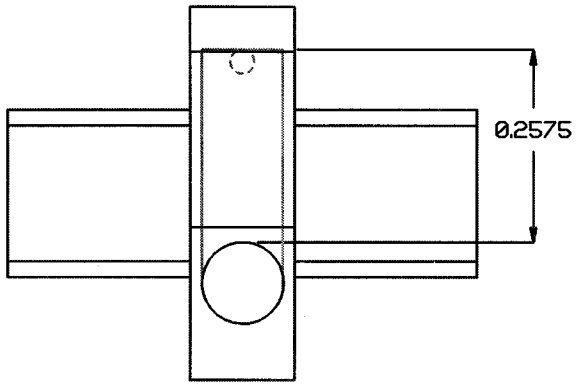


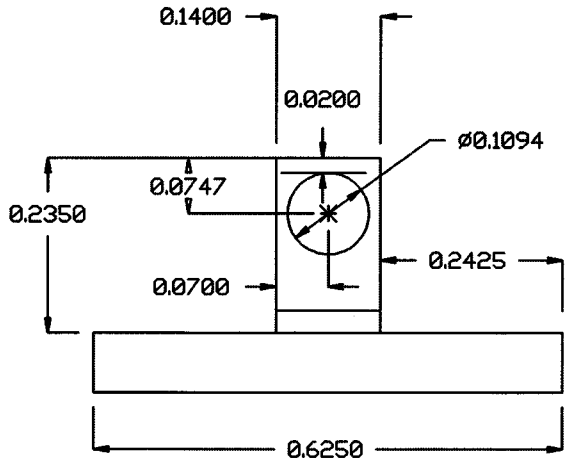


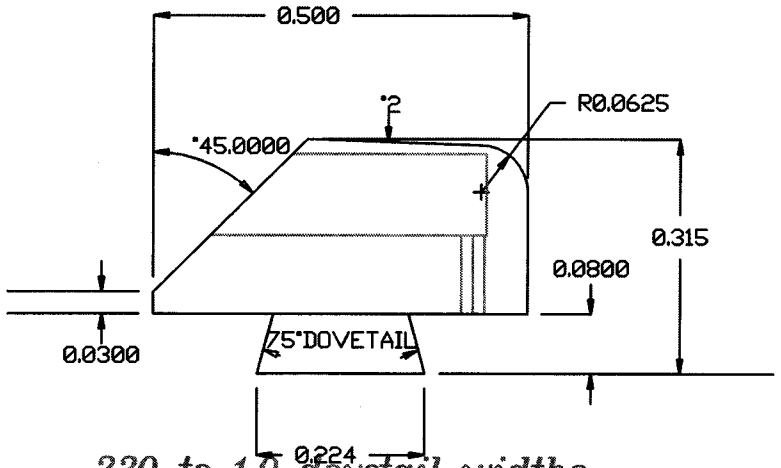


ISSUE	REVISION	DATE	BY	CHK'D

DRAWN D.J.F.	UNERTL OPTICAL Co.		
DATE			
CHK'D			
APPR.	TITLE Hand-Gun Front Sight		
DATE			
SYSTEM			
SCALE	SIZE	DRWG NO.	



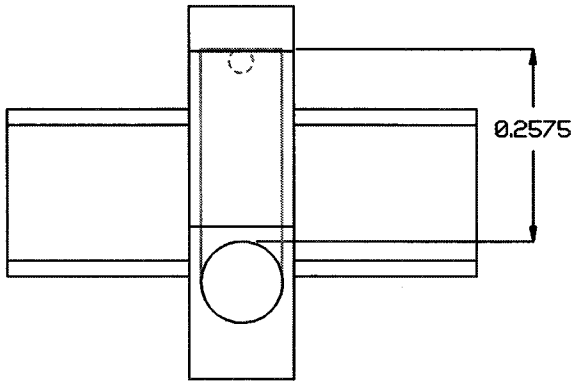


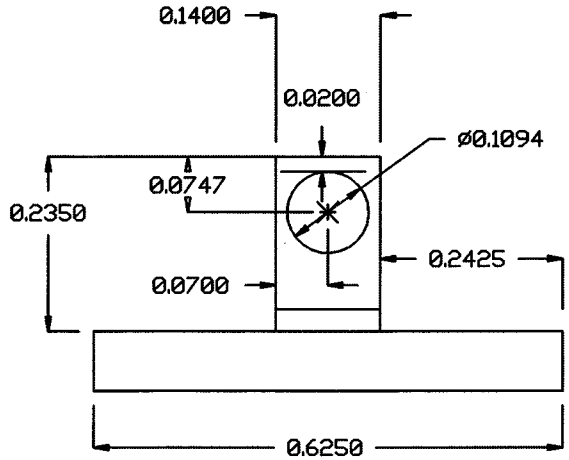


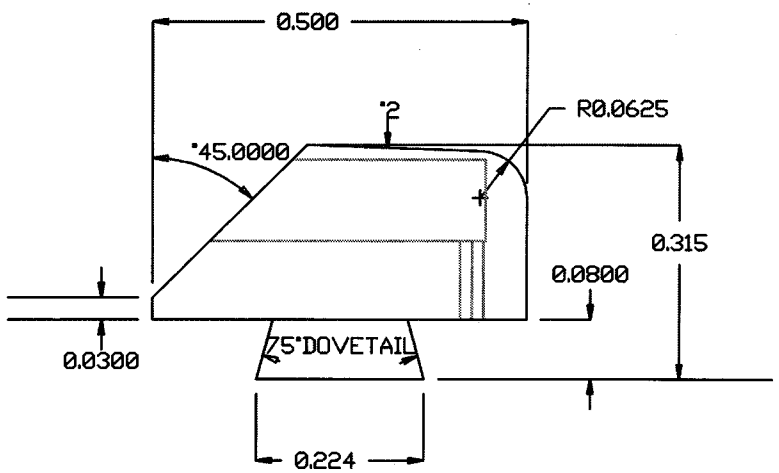
.220 to 1.0 dovetail widths

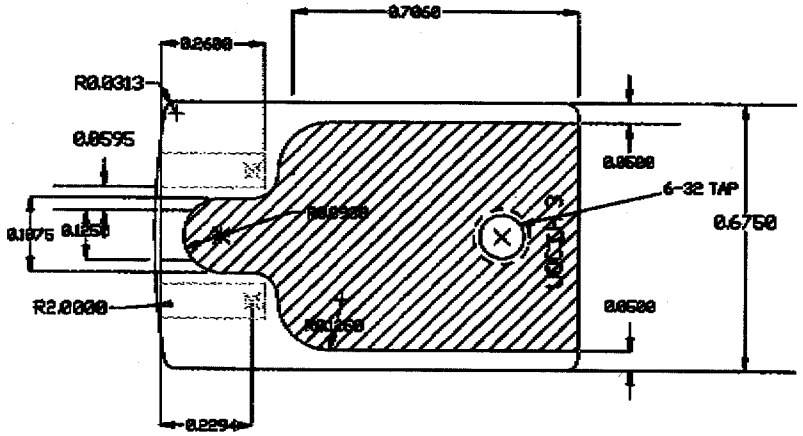
ISSUE	REVISION	DATE	BY	CHK'D

DRAWN D.J.F.	UNERTL OPTICAL Co.		
DATE			
CHK'D			
APPR.	TITLE Hand-Gun Front Sight		
DATE			
SYSTEM			
SCALE	SIZE	DRWG NO.	





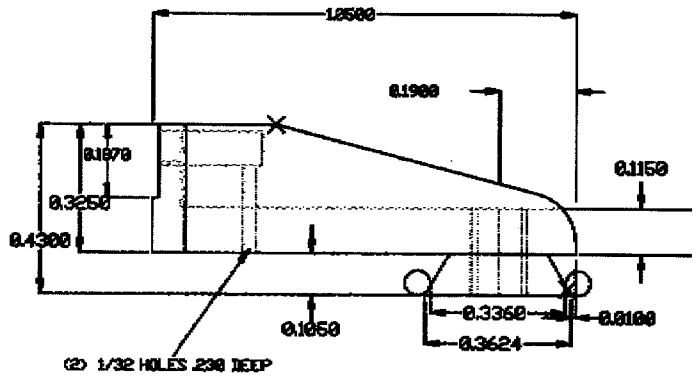


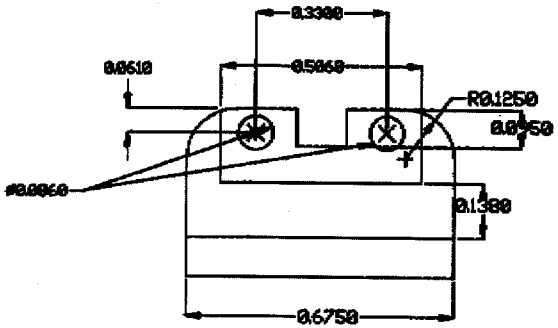


ISSUE	REVISION	DATE	BY	CHK'D

DRAWN B.J.F.	UNERTL OPTICAL CO.
DATE	
CHK'D	
APPR.	TITLE
DATE	Hand Gun Rear Sight
SYSTEM	

SCALE	SIZE	DRWG NO.





NRC FORM 313 U. S. NUCLEAR REGULATORY COMMISSION

(8-1999)
10 CFR 30, 32, 33
34, 35, 36, 39 and 40

APPROVED BY OMB: NO. 3150-0120 EXPIRES:08/31/2002

Estimated burden per response to comply with this mandatory information collection request: 7.4 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Records Management Branch (T-6 E6), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to bjs1@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

DIVISION OF INDUSTRIAL AND MEDICAL NUCLEAR SAFETY
OFFICE OF NUCLEAR MATERIALS SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

LICENSING ASSISTANT SECTION
NUCLEAR MATERIALS SAFETY BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PA 19406-1415

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

SAM NUNN ATLANTA FEDERAL CENTER
U. S. NUCLEAR REGULATORY COMMISSION, REGION II
61 FORSYTH STREET, S.W., SUITE 23T85
ATLANTA, GEORGIA 30303-8931

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
801 WARRENVILLE RD.
LISLE, IL 60532-4351

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING, SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING SECTION
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TX 76011-8064

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S.NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*
   - [X] A. NEW LICENSE
   - [ ] B. AMENDMENT TO LICENSE NUMBER _____
   - [ ] C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include Zip code)*
   Unertl Optical Company, Inc.
   2900 S. Highland Dr.
   Building 18C
   Las Vegas, Nevada 89109

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED
   2900 S. Highland Dr.
   Building 18C
   Las Vegas, Nevada 89109

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION
   Rocky Green

   TELEPHONE NUMBER
   w(702) 369-4092/m(949) 697-8733

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL.
   a. Element and mass number; b. chemical and/or physical form; and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM.

11. WASTE MANAGEMENT.

12. LICENSEE FEES *(See 10 CFR 170 and Section 170.31)*

FEE CATEGORY	AMOUNT ENCLOSED $

13. CERTIFICATION. *(Must be completed by applicant)* THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, 36, 39 AND 40, AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OFJUNE 25, 1948 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Rocky A. Green, President, Unertl Optical Co. Inc.	Rocky A. Green	January 24, 2003

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED $	CHECK NUMBER	COMMENTS
APPROVED BY				DATE	

UNERTL OPTICAL COMPANY, INC
2900 SOUTH HIGHLAND DRIVE
BUILDING 18C
LAS VEGAS, NEVADA 89109

Application for material license for Gun sights containing tritium gas sealed in sealed glass vials:

1. This is an application for a new license

2. Name and mailing address of applicant:
   Unertl Optical Company, Inc:
   2900 South Highland Drive, Building 18C, Las Vegas, Nevada 89109

3. Address where license material will be used or possessed:
   2900 South Highland Drive, Building 18c, Las Vegas, Nevada 89109

4. Person to be contacted about the application:
   Rocky Green
   Phone number: Office (702) 369 4092; Mobile (949) 697-8733

5. Radioactive Material: Tritium gas sealed in glass vials. Maximum of 60,000 sealed vials.

6. Purpose for which license material will be used: Gun sights containing tritium gas sealed in glass vials: Exempt material.

7. Individuals responsible for radiation safety program and their training experience: John Bonham (responsible for safety training); Rocky Green (overall responsibility for safety program); Resumes attached. (Attachment 1)

8. Training for individuals working in or frequenting restricted areas: John Bonham, Al Ling and Dan Faulkner: Qualifications attached. (Attachment 2)

9. Facilities and Equipment: Diagram and list of equipment attached. (Attachment 3)

10. Radiation Safety Program. The program is attached as Quality Control Procedures. (Attachment 4)

11. Waste Management. All tritium vials wherein the luminescence is not active or are otherwise unusable will be returned to manufacturer.

(Please see cover page for signature; Please see next page for Attachments)

(continued)

Enclosed Attachments:

1 - Resumes
2 - Training
3 - Facilities
4 - Quality Control Procedures
5 - Gun Sight Drawings
6 - Tritium Vial and Plastic Tube Dimensions
7 - Impruv
8 - Black Max

APPLICATION FOR EXEMPT MATERIAL LICENSE

Supplemental Information

Device Type:	Luminous Gun Sights
Model:	All models included in the Application
Manufacturer/Distributor:	Unertl Optical Company, Inc. 2900 S. Highland Drive Bldg 18C Las Vegas. Nevada 89109
Sealed Source Model Designation	Lumitec model numbers CL/1.5/487/A; CL/1; 5/4; 85; CL/0; 95/3; 3
Isotope:	Hydrogen 3
Maximum Activity:	180 mci per device 30mci per source
Leak Test Frequency	Not Required
Principal Use	Self-luminous applications
Custom Device:	Gun Sights

Description: Lumitec Model CL/1.5/487/A and CL/o.95/3.3 sealed tritium light sources are constructed using borosilicate glass tubes coated with a phosphor, filled with tritium gas and laser sealed. Curie content per source is 20mc as certified by Lumitec. The light sources with an outside diameter of 1.5mm, wall thickness of 0.15mm and a length of 4.85mm. The capillary tubes are manufactured from Duran glass. Coated on inside surface with a phosphorous material and filled with tritium gas to a required pressure of 230kPa(33p). Further description of the manufacturing process is contained in IAEA Technical Report 324(IAEA91). The vials are only for use on guns that will not impact greater than the light source that where tested (glass 0.15mm). Our Quality Assurance program will include a sworn statement from Lumitec verifying that vials do not exceed 30 millicuries.

Radiation Levels: There is no measurable external radiation. The beta particle with a maximum energy of 18.6keV cannot escape through a glass wall 0.15 mm

DEVICE TYPE

Gun sights

DESCRIPTION

Gun sights may be supplied to the end user in one of three manners: Supplied as a separate unit with light source installed by Unertl Optical Company, Inc. (UOCI); supplied attached to appropriate gun with light source installed by UOCI; supplied as an integral part of the gun (permanent installation) into which UOCI will mount the appropriate light source. Gun sights supplied as a separate unit or already attached to the gun are mounted to the gun by a dove-tail, post, or screw type mount (see attachment 5) . The type mount is constructed in accordance with the original equipment gun manufacturer's or sight manufacturer's requirements.

Gun sights are either a front sight configuration or a rear sight configuration, or both. Front sights will contain a single "dot" light source. Rear sights may contain from one to five light sources in "dot" or "bar" configurations. The gun sights and mounts are constructed of an appropriate steel alloy, an appropriate aluminum alloy or a plastic in accordance with the original equipment gun manufacturer's or gun sight manufacturer's specifications. The sealed tritium vials will be inserted into plastic tubes (size dimensions in Attachment 6). The plastic tubes will be inserted into sights using Impruv (see Attachment 7) or Blackmax for lensing (see Attachment 8).

LABELING

Gun sights supplied as separate units or as units attached to guns will be labeled with H-3 (isotope) and UOCI (manufacturer).

Gun sights permanently fixed on weapons and into which light sources will be mounted will have either the sight (if possible) or the frame of the weapon, as close to the sight as possible, stamped with H-3 (isotope) and UOCI (manufacturer).

CONDITIONS OF NORMAL USE

The tritium illuminated gun sights are intended for use with guns in a variety of environments. Law enforcement personnel, military, target shooters, or sport hunters, may use the guns sights. The environments would, therefore, be suitable for humans. In addition, the sights will be subjected to intense shock each time the gun is fired, and possibly to other distress if the gun is accidentally dropped or impacted during use.

DESIGN

3.1.1 Each gun sight is designed so that in normal use and disposal of a single gunsight, it is unlikely the external radiation dose in any one year, or the dose commitment resulting from the intake of radioactive material in any one year, to a suitable sample of the group of individuals expected to be most highly exposed to radiation or radioactive material from the gunsight will exceed the dose to the appropriate organ as specified in Column I of Table O.1, Table of Organ Doses (32.24).

Answer: The gun sights themselves are relatively expensive items and are precisioned machined for insertion these specific sealed tritium vials (encased in a plastic sleeve). Once machined, the sealed tritium vial itself (encased in plastic) is implanted into the gun sight. Therefore, it is highly unlikely to be purposefully or inadvertently removed from the firearm. The disposal of an intact firearm through normal trash is highly unlikely and if such a case were to occur, the sight would in all likelihood remain intact and the tritium source would therefore remain sealed and protect by the surrounding metal. Instructions accompanying the sights request return of damaged or defective sights or sights that have reached the end of their useful life to Unertl for proper disposal. It is foreseeable that at the end of the sights useful self-luminous life, the end user may merely continue to use the sights as a standard iron sight. Therefore, improper or careless disposal of any sights is highly unlikely and consequently the possibility of any significant radiation dose is remote.

NUREG/CR-0215 estimates the dose commitment to the maximally exposed individual for burial of 500,000 tritium lighted wristwatches per year in landfills (20,000 in a single location) to be 0.1 mrem/yr. If the sources are burned a potential maximum dose commitment of 17 mrem/yr is estimated. The total number of gun sights potentially disposed of in a single year would be much lower than NUREG/CR-0215 estimates and the H-3 activity per unit would also be significantly lower by a factor of seven than that postulated for watches containing H-3.

It should be noted that all conceivable situations, including, but not limited to, normal use, storage, transportation and the unlikely unintentional or intentional disposal of these gun sights, involve minute quantities of H-3 and/or shorter exposure times, thus resulting in negligible dose exposure.

No radiation dose commitment is anticipated, and in fact, none has been experienced, during normal use of the gun sight systems. External radiation dose rate at 25 cm is estimated to be less than 0.001 mrem/hr. The tritium gas is sealed in borosilicate glass, encased in a plastic tube and then imbedded in metal (gun sight). Therefore no inhalation or ingestion of the radioactive material is expected in normal use.

For the reasons stated above, disposal of gun sights, whether intentional or unintentional, will not present a radiation hazard to the general public.

3.1.2 In normal handling and storage of quantities of gun sights likely to accumulate in one location during marketing, distribution, installation, and servicing of the gun sights, it is unlikely that the external radiation dose in any one year, or the dose commitment resulting from the intake of radioactive material in any one year, to a suitable sample of the group of individuals expected to be most highly exposed to radiation or radioactive material from the gun sight(s) will exceed the dose to the appropriate organ as specified in Column II of Table 0.1, Table of Organ Doses (32.24).

Answer: Distilled water immersion tests on the sights indicated a leakage rate no greater than 1 E-5 uCi/sight in a 24 hour period. Assuming that 8,000 units containing three tritium sources each and 2,000 units containing one source each (for a total of 26,000 sealed tritium sources) are stored in a 14' x 10' room (with two entrances/exits, a circulating filtered air/air conditioning system, and an air exchange rate estimated at 3 total air changes per hour) within a 1,000 square foot office space inside a 5,000 square foot warehouse with its own circulating air system (estimated air exchange rate in the warehouse is 3 total air changes per hour), the calculated equilibrium concentrate of tritium is as follows:

$$C = \frac{I}{\lambda V}$$

where:

I = rate of influx of H-3 gas
V = volume of the room
λ = air exchange rate
C = equilibrium H-3 gas

$$C = \frac{1.1E{-}2 uCi/hr}{3a\ ch/hr X 3.96E7 cc} = 0.09E\text{-}10 uCi/cc$$

C = 0.09E – 7mCi/cubic meter

Concentration:

I = 26 ,000 sights x 1 E-5 uCi/sight – 24 hr = 1.1 E-2 uCi/hr
V = 1400 cubic ft x 2.83 E4 cc/cubic foot = 3.96 E7 cc

The concentration limit set in 10 CFR Part 20, Appendix B, Table 2, Column 1 for H-3 in air is 2 E-7 uCi/mi. The calculated equilibrium concentration in the storage are is substantially less that the 10 CFR 20 concentration limit for a controlled area.

The annual dose exposure to a warehouse worker, working in the area for 1 hour per day, 250 days/year is as follows:

Assuming:

1. All H-3 gas is converted to tritiated water.
2. Total rate of absorption of tritiated water into body fluids (mCi/minute) from inhalation and skin absorption is 3 E-2C, where C is the concentration of tritiated water in air in mCi/cubic meter (ICRP 30).
3. Committed dose equivalent per unit intake of tritiated water is 1.7E-11 Sv/Bq (6.3 E-2 rem/mCi).
4. Annual exposure dose:

   H = 0.09 E-7 mCi/cubic meter x 3 E-2 mCi/cubic meter/mCi-minute x 60 minute/hour x 250 hr/yr x 6.3 E-2 rem/mCi = .08505 E-6 rem/year

   H = 0.000085 m/rem/yr

3.1.3 It is unlikely that there will be a significant reduction in the effectiveness of the containment, shielding, or other safety features of the gun sight from wear and abuse likely to occur in normal handling and use of the gun sight during its useful life.

Answer: No radiation dose exposure is anticipated during normal use of the gun sight systems. External radiation dose rate at 25 cm is estimated to be less than .0001 mrem/hr. The tritium gas is sealed in borosilicate glass, encased in a plastic tube and then imbedded in metal (gun sight), thereby eliminating any possibility of inhalation or ingestion of the radioactive material during normal use.

The gun sights themselves are relatively expensive items and are precisioned machined for insertion these specific sealed tritium vials (encased in a plastic sleeve). Once machined, the sealed tritium vial itself (encased in plastic) is implanted into the gun sight. Therefore, it is highly unlikely to be purposefully or inadvertently removed from the firearm. The unapproved disposal of an intact firearm is highly unlikely and if such a case were to occur, the sights would in all probability remain intact and the tritium source would remain sealed and protect by the surrounding metal. Instructions accompanying the sights request return of damaged or defective sights or sights that have reached the end of their useful life to Unertl for proper disposal. Therefore, improper or careless disposal of any sight is highly unlikely to cause any significant radiation dose.

NUREG/CR-0215 estimates the dose commitment to the maximally exposed individual for burial of 500,000 tritium lighted wristwatches per year in landfills (20,000 in a single location) to be 0.1 mrem/yr. If the sources are burned a potential maximum dose commitment of 17 mrem/yr is estimated. The total number of gun sights potentially disposed of in a single year would be much lower and the H-3 activity per unit would also be significantly lower by a factor of seven than that postulated for watches containing H-3.

It should be noted that all conceivable situations, including, but not limited to, normal use, storage, transportation and the unlikely unintentional or intentional disposal of these gun sights, involve minute quantities of H-3 and/or shorter exposure times, thus resulting in negligible dose exposure.

This gun sight system has been in existence for many years. No radiation dose commitment is anticipated, and in fact, none has been known to be experienced, during normal use of the gun sight systems. External radiation dose rate at 25 cm is estimated to be less than 0.001 mrem/hr. The tritium gas is sealed in borosilicate glass, therefore no inhalation or ingestion of the radioactive material is expected in normal use.

Therefore, disposal of gun sights, whether intentional or unintentional, will not present a radiation hazard to the general public.

3.1.4 In the use and disposal of a single gun sight, or in handling and storage of the quantities of gun sight likely to accumulate in one location during marketing , distribution, installation, and servicing of the gun sight, the probability is low that the containment, shielding, or other safety features of the gun sight would fail under such circumstances that a person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ in Column III of Table O.1, Table of Organ Doses (32.24) and the probability is negligible that a person would receive an external radiation dose or dose commitment in excess of the dose to the appropriate organ in Column IV of Table 0.1, Table of Organ Doses (32.24).

Answer: The maximum credible accident involving the use of the gun sight system is rupture of the sealed source and instantaneous release of the gas during firing. Only the rear sight is of consequence since it is much closer to the breathing zone of the user than the front sight. Of note: no sealed source is ever known to have failed (ruptured) once installed into a gun sight and this system has been in existence for many years.

Assuming:

1. Rear sight contains a total of 12 mCi of H-3 gas.
2. Rear sight is 15 cm from the user's face.
3. Breathing zone can be represented by a cone with apex at the source and base, a 10 cm diameter circle at the user's face.
4. All H-3 is converted to tritiated water instantly.
5. Effective half-time for tritiated water equals 10 days.
6. total absorption of inhaled tritium in body fluids.
7. Mass of soft tissue equal 63,000 g (ICRP 30)

Fraction of gas released in the direction of the breathing zone:

$$F = \frac{\pi r X r}{4\pi R X R}$$

where

r = radius of the base of the cone
R = distance from source to nose

$$F = \frac{3.14 \text{ X } 5 \text{ X } 5 \text{ sq cm}}{4 \text{ X } 3.14 \text{ X } 15 \text{ X } 15 \text{ sq cm}} = 0.03$$

Maximum estimated dose commitment to user assuming all H-3 gas is converted to tritiated water.

H = 12 mCi X 0.03 X 6.3E-2 rem/mCi = 23 mrem

In the unlikely event of an accidental instantaneous release (rupture), most of the gas would remain as elemental H-3. The dose commitment from H-3 gas would be approximately 1000 times less. The total estimated dose commitment would be 2% of the calculated value since up to 2% of the gas originally in the glass capsule could be in the form of tritiated water.

No significant radiation dose commitment is expected to result from rupture of the sealed source contained within the gun sight since rapid atmospheric dispersion and instantaneous dilution within the atmosphere would swiftly reduce tritium concentrations in air to minimal background levels.

The maximum credible accident involving storage of the units would involve fire in the storage area which penetrates the fire resistance qualities of the security safe and ruptures some of the borosilicate glass capsules. (A massive fire which would rupture all sources would be likely to result in immediate dispersion of the H-3 gas and dilution with outside air, thus reducing the concentrations of H-3 gas in the storage area/atmosphere.

Assuming:

1. 50% of the sources ruptured.
2. Immediate dispersion of the gas within the storage area
3. Conversion of all H-3 to tritiated water.

Total rate of absorption of tritiated water into body fluids (mCi/minute) from inhalation and skin absorption is 3 E-2 C, where C is the concentration of tritiated water in air in mCi/cubic meter (ICRP 30).

$$C = \frac{266Ci \times 0.50}{3.96E7cc} = 3.3E\text{-}6Ci/cc = 3.3E3\ mCi/cubic\ meter$$

Dose commitment:

H = 3.3 E3 mCi/cubic meter x 3 E-2 mCi – cubic meter/mCi-min x 6.3 E-2 rem/mCi

H = 6.2 rem/minute

Dose commitment to firemen remaining in enclosed area without respiratory protection for 2 minutes for purpose of rescue equal 12 rem.

This calculation greatly overestimates the true dose commitments in this situation. Air currents would disperse the gas very rapidly in the case of a fire, particularly one of such severity as to rupture 50% of the sources instantaneously inside a fire resistant safe approved by Underwriters Laboratory. In addition, only a small fraction of the H-3 gas is likely to be converted to tritiated water before venting to the outside.

A more reasonable estimate of the dose commitment would be obtained using the maximum fraction of tritiated water in the source, 0.02. If this value is used, the dose commitments become 12 mrem for the occupant and 24 mrem for the fireman. Additionally, all firemen are now required to use respiratory protection when entering a building.

3.1.5 It is engraved, stamped or painted with H-3 and the name of the manufacturer.

Answer: All sights will be engraved, stamped or painted with H-3 on the left side, and UOCI on the other side, of the sight.

PROTOTYPE TESTING

The Lumitec tritium sources are manufactured in accordance with Ministry of Defense Standard 62-4/issue 4. This standard requires the sources to be subjected to a sealing test, a visual examination test, a vibration test, an external pressure test, and a thermal cycling test. In addition, the manufacturer subjected the prototype sources to an impact test dropped 20 times from 6.56' (2 m), and an immersion test (in accordance with ANSI-N540). All sources were subjected to a 24 hour soak test (in accordance with ANSI-N540) and luminosity comparison before and after testing. The manufacturer indicated that the soak test revealed less than 5 nci (1850 bj) leakage for all sources and that there was no significant decrease in luminosity following the tests.

3.2.1 CHEMICAL

Chemical testing was performed on sights to determine the effects, if any, on solutions designed for normal cleaning and maintenance of firearms. The testing procedures and data are enclosed for your review. Trichloromethane (chloroform) is not commonly used in chemicals due to its hazardous nature. Trichloroethane has replaced it in many solvents and chemical cleaners. Gun Scrubber produced by Birchwood Laboratories uses Trichoroethane 350ppm and was used in the chemical testing of our sites. Accubore, the civilian equivalent to U. S. Government Issue gun bore cleaner MIL-C373B, was used in the chemical testing of the our sites.

Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

3.2.2 TEMPERATURE

Thermal testing was performed in order to subject the sight and their bonding agents to fluctuations in temperature. The lensing material (Impruv) and the bonding agent (Black Max) have temperature-operating variances between –46c to 120c. Testing procedures along with chemical analysis supplied by manufacturers are enclosed for your review (see Attachments 7 and 8). This test was done in accordance with 3.2.2 NUREG 1556 vol 8. Tests were completed January 23, 2003.

Relative Humidity: The gun sights were placed in an environment of 100% relative humidity and a temperature of 42c, and left in this environment for 48 hours.

Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

3.2.4 VIBRATION

The gun sights were placed in a vibratory to subject sights to simple harmonic motion having an ampititude of 0.075cm. The vibration cycle went from 10hz to 50 hz and back

again in one minute. This was performed for 12 cycles. The gun sights were given 30 minutes of vibration at a resonance frequency.

Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

3.2.5 PRESSURE

Gun sights were placed in a test chamber and exposed to 30 psi or 2.0 bards of pressure for 4 periods of 15 minutes each. The pressure was released between each of the 4 test periods.

Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

3.2.6 PENETRATION

A hammer (tubular metal) with a small point weighing approximately 15 grams was dropped through a guide tube from a height of 44 inches onto a light sources. The gun sights were checked for brightness prior to testing, immediately following testing, and then 8 hours after the tests were performed. There was no discernable change in brightness in the gun sights.

Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

3.2.7 MECHANICAL SHOCK

The gun was dropped from 2 meters onto a hard surface 1 ½" thick 85 durometer rubber backed by concrete. The gun was dropped 60 times in a manner that it stuck the surface ten times in each of the following attitudes: Barrel vertical, muzzle down; barrel vertical, muzzle up; barrel horizontal, bottom up; barrel horizontal, bottom down; barrel horizontal left side up; and barrel horizontal, right side up

Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

3.2.8 FIRING

All sights configurations were mounted on a gun and fired 5,000 times sequentially with lapses only to allow reloading.

Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

3.2.9 EVALUATION

After each test, the gunsight was immersed in water for 24 hours at ambient temperature. The volume of the water was equal to 10 times that of the volume of the gunsight. The gunsight was removed and the activity of the solution was measured. The activity of the solution was less than 50 nanocuries.

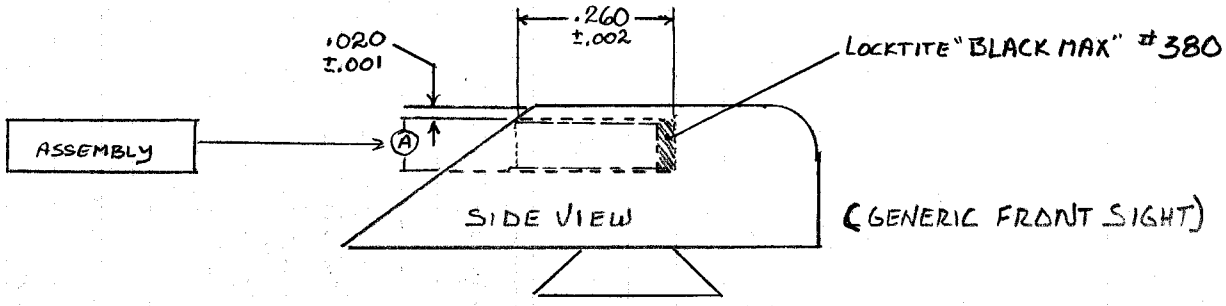
Results: Inspection and evaluation following these tests resulted in no visible or noticeable deterioration whatsoever. All sights were intact, fully functional and still luminescent, with no discernable deterioration.

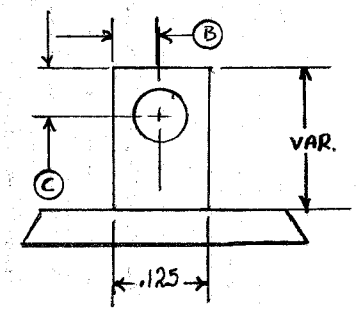
Conclusion: All sights passed all tests. A passed classification means the sights were still glowing without any deterioration. All testing was verified using a pass/fail classification to determine whether a bonging illumination, chemical deterioration, fatigue or similar failures occurred during the testing procedures.

PLASTIC TUBE-TRITIUM VIAL - SIGHT ASSEMBLY

FRONT HANDGUN SIGHT

GENERIC





FRONT VIEW

(A) = .108
.093
.086
.078

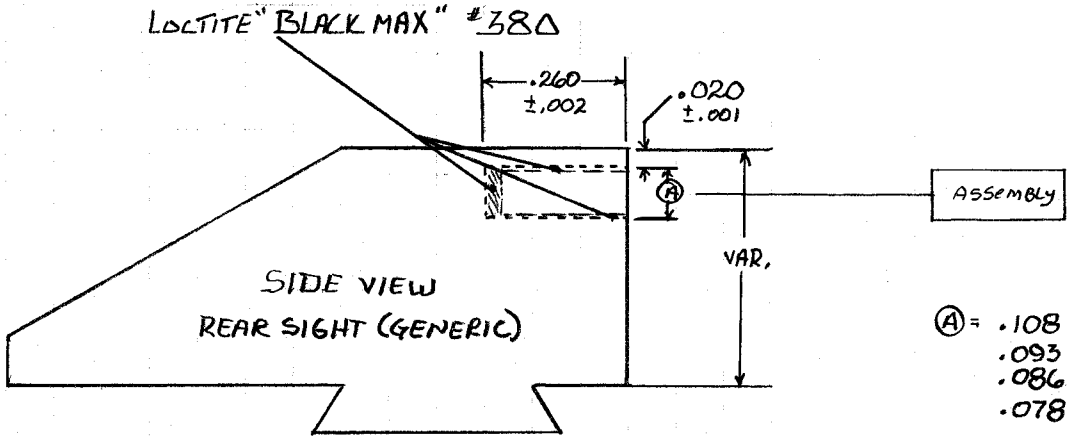
(B) = .062 OR ℄

(C) = .074 (.108 TUBE)
.0665 (.093 TUBE)
.063 (.086 TUBE)
.059 (.078 TUBE)

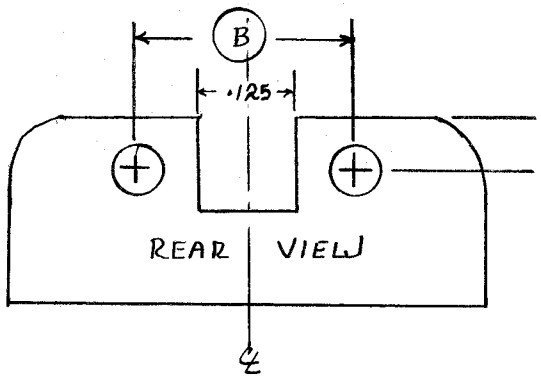
PLASTIC TUBE - TRITIUM VIAL - SIGHT ASSEMBLY

REAR HANDGUN SIGHT

GENERIC



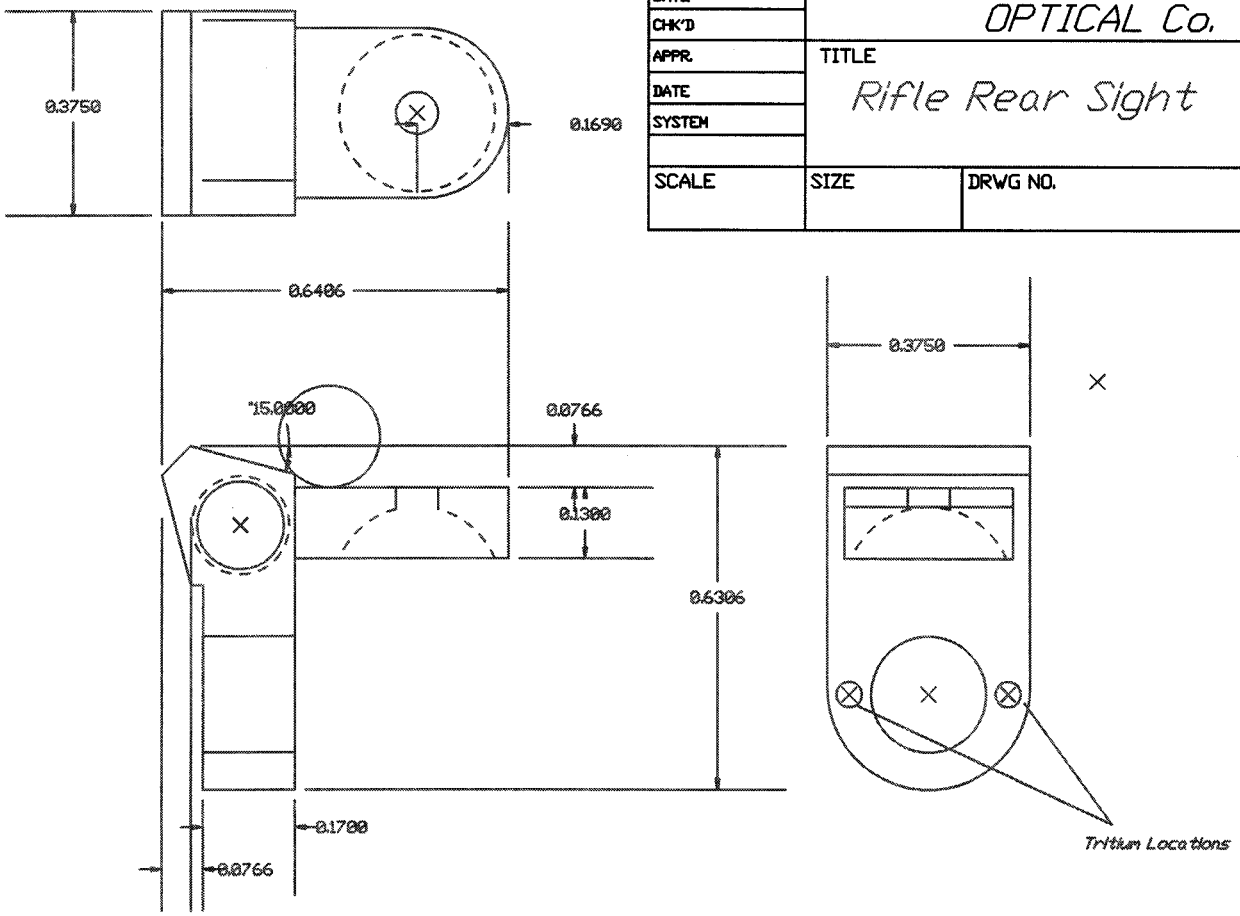
Ⓐ = .108
.093
.086
.078



Ⓑ = .273 (.108 TUBE)
.258 (.093 TUBE)
.251 (.086 TUBE)
.243 (.078 TUBE)

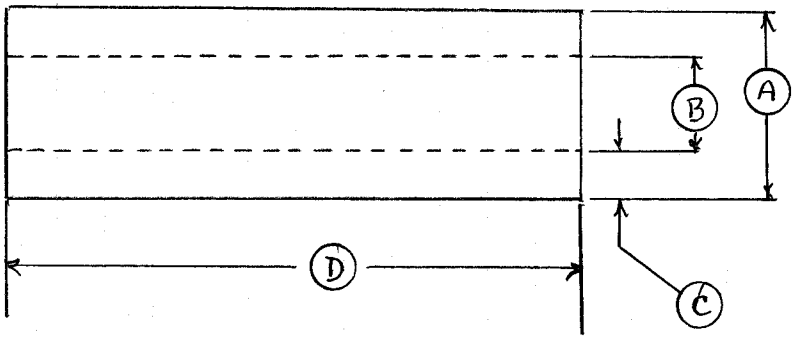
ISSUE	REVISION	DATE	BY	CHK'D

DRAWN D.J.F.	UNERTL OPTICAL Co.	
DATE		
CHK'D		
APPR.	TITLE	
DATE	Rifle Rear Sight	
SYSTEM		
SCALE	SIZE	DRWG NO.



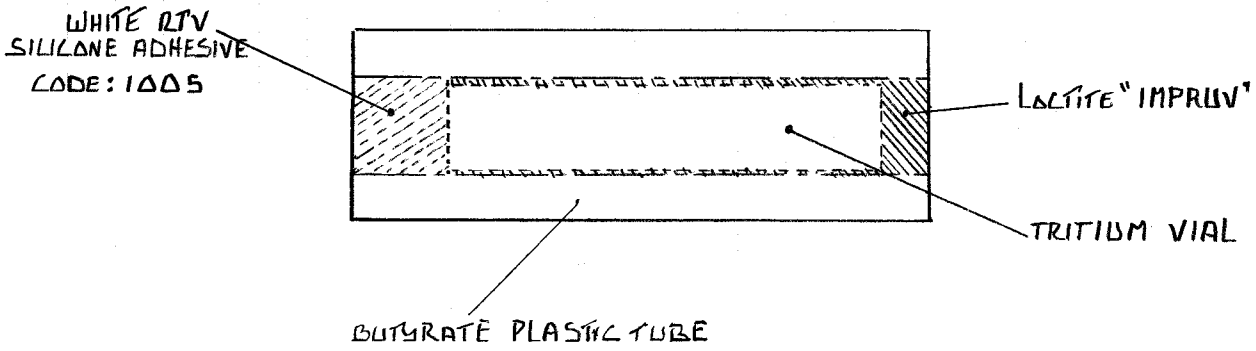
PLASTIC TUBES (BUTYRATE)

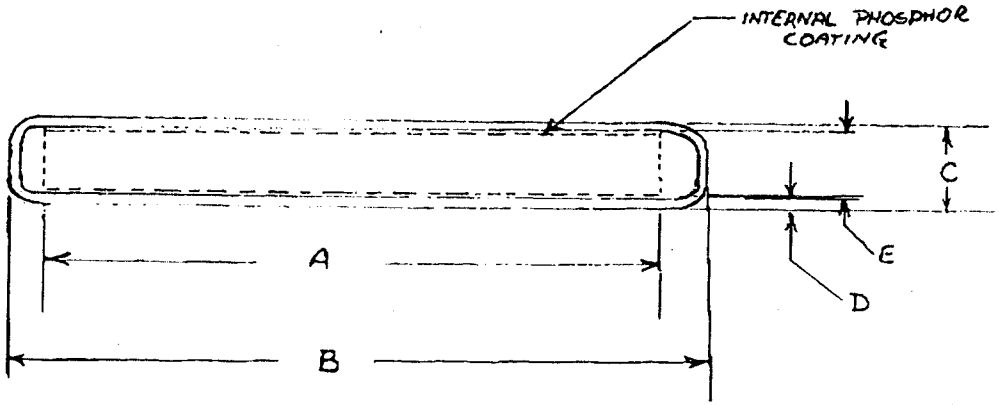
DIMENSIONS



A	B	C	D
.078	.062	.008	.257
.086	.062	.012	.257
.093	.062	.0155	.257
.108	.062	.023	.257

PLASTIC TUBE-TRITIUM VIAL ASSEMBLY





REFEENCE-	A	B	C	D	E
LARGE TUBE	.145	.187	.059	.010	.039
SMALL TUBE	.095	.125	.037	.0075	.022
DIMENSIONS IN MM					
LARGE TUBE CL/1.9/4.85	3.683	4.7498	1.4986	.254	.9906
SMALL TUBE CL/0.95/3.3	2.413	3.175	.889	.1905	.5588

** TOTAL PAGE.001 **

HENKEL LOCTITE CORPORATION
01/12/03

ROCKY HILL, CONNECTICUT 06067
EMERGENCY PHONE: (860) 571-5100

MATERIAL SAFETY DATA SHEET

365 Impruv(R) Adhesive/Sealant UV Cure
36590

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name:	365 Impruv(R) Adhesive/Sealant UV Cure
Item No.:	36590
Product Type:	UV Curing Adhesive

2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredients	CAS No.	%
Polyesterurethane methacrylate	Proprietary	50-55
High boiling methacrylate	68586-19-6	30-35
Hydroxyalkyl methacrylate	868-77-9	5-10
ACRYLIC ACID*	79-10-7	1-3
tert-BUTYL PEROXYBENZOATE	614-45-9	1-3
Photoinitiator	947-19-3	1-3
Saccharin	81-07-2	1-3
Substituted silane	2530-83-8	1-3

* This component is listed as a SARA Section 313 Toxic Chemical.

The polyesterurethane methacrylate is registered with the State of New Jersey as a trade secret: NJ TSRN 06-070-1067-5016P.

Ingredients which have exposure limits

Exposure Limits (TWA) Ingredients	ACGIH (TLV)	OSHA (PEL)	OTHER
Hydroxyalkyl methacrylate	None	None	3 ppm ceiling
ACRYLIC ACID	2 ppm TWA skin	10 ppm TWA skin	1 ppm TWA skin
	5.9 mg/m3 skin	30 mg/m3 skin	3 ppm STEL skin
Photoinitiator	None	None	10 mg/m3

Exposure Limits (STEL) Ingredients	ACGIH (TLV)	OSHA (PEL)

3. HAZARDS IDENTIFICATION

Toxicity: Severe eye irritant. Moderate skin irritant.
Possible inhalation irritant. May be harmful if swallowed. May cause kidney or liver damage.
Estimated oral LD50 more than 5000 mg/kg.
Estimated dermal LD50 more than 2000 mg/kg.

Primary Routes of Entry: None known

Product Name: 365 Impruv(R) Adhesive/Sealant UV Cure
Item No.: 36590

3. HAZARDS IDENTIFICATION (continued)

Signs and Symptoms of Exposure: Irritation of eyes, skin, nose or throat. May cause severe dermatitis on prolonged contact in sensitive individuals.

Existing Conditions Aggravated by Exposure: Acrylic acid: Upper respiratory and lung diseases, dermatitis

Literature Referenced

Carcinogen Ingredients	Target Organ and Other Health Effects	NTP	IARC	OSHA
Polyesterurethane methacrylate	No Data	NO	NO	NO
High boiling methacrylate	ALG IRR	NO	NO	NO
Hydroxyalkyl methacrylate	ALG IRR	NO	NO	NO
ACRYLIC ACID	ALG COR IRR KID LIV	NO	N/A	NO
tert-BUTYL PEROXYBENZOATE	CNS IRR MUT	NO	NO	NO
Photoinitiator	No Data	NO	NO	NO
Saccharin	NTO	NO	N/A	NO
Substituted silane	ALG IRR	NO	NO	NO

Abbreviations

N/A Not Applicable	ALG Allergen
CNS Central nervous system	COR Corrosive
IRR Irritant	KID Kidney
LIV Liver	MUT Mutagen
NTO No Target Organs	

4. FIRST AID MEASURES

Ingestion: Do not induce vomiting. Keep individual calm.
Obtain medical attention.

Inhalation: Remove to fresh air. If symptoms persist, obtain medical attention.

Skin Contact: Wash with soap and water.

Eye Contact: Flush at least 15 minutes with water. Obtain medical attention.

5. FIRE FIGHTING MEASURES

Flash Point: More than 200°F Method: Tag Closed Cup

Recommended Extinguishing Agents: Carbon dioxide, foam, dry chemical

Special Firefighting Procedures: Not available

5. FIRE FIGHTING MEASURES (continued)

Hazardous Products formed by Fire or Thermal Decomp Irritating organic vapors

Unusual Fire or Explosion Hazards: None

Explosive Limits:
(% by volume in air)Lower 2.0% Acrylic acid
(% by volume in air)Upper 8.0% Acrylic acid

6. ACCIDENTAL RELEASE MEASURES

Steps to be taken in case of spill or leak:	Soak up in an inert absorbent. Store in a partly filled, closed container until disposal.

7. HANDLING AND STORAGE

Safe Storage:	Store below 100°F
(Contact Loctite Customer information)	Service 1-800-243-4874 for shelf life
Handling:	Avoid prolonged skin contact. Keep away from eyes. Avoid prolonged breathing of vapors.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Eyes:	Safety glasses or goggles.
Skin:	Rubber or plastic gloves.
Ventilation:	Sufficient to maintain vapor concentration below TLV.
Respiratory	Not available
	See Section 2 for Exposure Limits.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Amber liquid
Odor:	Sharp
Boiling Point:	More than 300°F
pH:	Does not apply
Solubility in Water:	Low
Specific Gravity	Approximately 1.1
Volatile Organic Compound (EPA Method 24)	Per ASTM D5403 Process volatiles 1.17%; 12.87 grams per liter Potential volatiles 1.02%; 11.22 grams per liter Total volatiles 2.19%; 24.09 grams per liter
Vapor Pressure:	Less than 5mm
Vapor Density:	Not available

9. PHYSICAL AND CHEMICAL PROPERTIES (continued)

Evaporation Rate (Ether = 1)	Not Available

10. STABILITY AND REACTIVITY

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility:	None
Conditions to Avoid:	Not available
Hazardous Decomposition Products (non-thermal):	None

11. TOXICOLOGICAL INFORMATION

See Section 3.

12. ECOLOGICAL INFORMATION

No data available

13. DISPOSAL CONSIDERATIONS

Recommended methods of disposal:	Incinerate following EPA and local regulations.
EPA Hazardous Waste Number	NH - Not a RCRA Hazardous Waste Material

14. TRANSPORTATION INFORMATION

DOT (49 CFR 172)

Domestic Ground Transport

Proper Shipping Name:	Unrestricted
Hazard Class or Division:	Unrestricted
Identification Number:	None
Marine Pollutant:	None

IATA

Proper Shipping Name:	Unrestricted
Class or Division:	Unrestricted
UN or ID Number:	None

15. REGULATORY INFORMATION

CA Proposition 65: WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Ethylene oxide, toluene, acetaldehyde,

HENKEL LOCTITE CORPORATION
01/12/03

ROCKY HILL, CONNECTICUT 06067
EMERGENCY PHONE: (860) 571-5100

MATERIAL SAFETY DATA SHEET

Loctite(R) Black Max(R) 380 Black Tough Inst Adh
38050

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Loctite(R) Black Max(R) 380 Black Tough Inst Adh
Item No.: 38050
Product Type: Cyanoacrylate

2. COMPOSITION, INFORMATION ON INGREDIENTS

Ingredients	CAS No.	%
Ethyl cyanoacrylate	7085-85-0	85-90
Ethylene copolymer rubber	54545-50-5	7-12
CARBON BLACK	1333-86-4	1-3
PHTHALIC ANHYDRIDE*	85-44-9	0.1-1
HYDROQUINONE	123-31-9	0.1-0.5

* This component is listed as a SARA Section 313 Toxic Chemical.

Ingredients which have exposure limits

Exposure Limits (TWA) Ingredients	ACGIH (TLV)	OSHA (PEL)	OTHER
Ethyl cyanoacrylate	0.2 ppm TWA	None	None
CARBON BLACK	3.5 mg/m3 TWA	3.5 mg/m3 TWA	5ppm
PHTHALIC ANHYDRIDE	1 ppm TWA	1 ppm TWA	None
HYDROQUINONE	2 mg/m3 TWA	2 mg/m3 TWA	2 mg/m3 TWA 4 mg/m3 STEL

Exposure Limits (STEL) Ingredients	ACGIH (TLV)	OSHA (PEL)

3. HAZARDS IDENTIFICATION

Toxicity: Skin contact may cause burns.
Bonds skin rapidly and strongly.
Skin and eye irritant.
Primary Routes of Entry: None known
Signs and Symptoms

of Exposure: Vapor is irritating to eyes and mucous membranes

above TLV. Exposure to vapors above the established limits may cause symptoms of non-allergic asthma.

Existing Conditions
Aggravated by Exposure: None known

3. HAZARDS IDENTIFICATION (continued)

Ingredients	Target Organ and Other Health Effects	NTP	IARC	OSHA
Ethyl cyanoacrylate	ALG IRR RES	NO	NO	NO
Ethylene copolymer rubber	No Data	NO	NO	NO
CARBON BLACK	RES	NO	2B	NO
PHTHALIC ANHYDRIDE	AC4 ALG COR IRR RES	NO	NO	NO
HYDROQUINONE	BLO BNM CNS EYE IMM IRR LIV MUT SKI THY	NO	N/A	NO

Literature Referenced
Carcinogen

Abbreviations

N/A Not Applicable	2B Possibly carcinogenic to humans
AC4 ACGIH-Unclassifiable as human carc.	ALG Allergen
BLO Blood	BNM Bone Marrow
CNS Central nervous system	COR Corrosive
EYE Eyes	IMM Immune system
IRR Irritant	LIV Liver
MUT Mutagen	RES Respiratory
SKI Skin	THY Thyroid

4. FIRST AID MEASURES

Ingestion:	Ingestion is not likely. See supplemental page for emergency procedures.
Inhalation:	Remove to fresh air. If symptoms persist, obtain medical attention.
Skin Contact:	Soak in warm water. See supplemental page for emergency procedures.
Eye Contact:	Flush with water. See supplemental page for emergency procedures.

5. FIRE FIGHTING MEASURES

Flash Point:	150 - 200°F Method: Tag Closed Cup
Recommended Extinguishing Agents:	Carbon dioxide, foam, dry chemical
Special Firefighting Procedures:	Not available
Hazardous Products formed by Fire or Thermal Decomp	Irritating organic vapors
Unusual Fire or Explosion Hazards:	None

Explosive Limits:

5. FIRE FIGHTING MEASURES (continued)

(% by volume in air) Lower	1.7%	Phthalic anhydride
(% by volume in air) Upper	10.5%	Phthalic anhydride

6. ACCIDENTAL RELEASE MEASURES

Steps to be taken in case of spill or leak:	Flood with water to polymerize completely. Solid polymer is non-hazardous.

7. HANDLING AND STORAGE

Safe Storage:	Store below 75°F.
(Contact Loctite Customer information)	Service 1-800-243-4874 for shelf life

Handling:	Avoid contact with skin and eyes. Avoid breathing vapor.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Eyes:	Safety glasses or goggles.
Skin:	Nitrile or polyethylene gloves and aprons. Do not use cotton. See supplemental page for additional information.
Ventilation:	Positive down-draft exhaust ventilation should be provided to maintain vapor concentration below TLV.
Respiratory	Not available
	See Section 2 for Exposure Limits.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Viscous, black liquid
Odor:	Sharp, irritating
Boiling Point:	More than 300°F
pH:	Does not apply
Solubility in Water:	Polymerized by water
Specific Gravity	1.1
Volatile Organic Compound (EPA Method 24)	Results by ASTM D-2369 87.9%
	Results by California SCAQMD Method 316B 0.63% 6.93 g/l
Vapor Pressure:	Less than 0.2mm Hg
Vapor Density:	Approximately 3
Evaporation Rate (Ether = 1)	Not available

10. STABILITY AND REACTIVITY

Stability:	Stable
Hazardous Polymerization:	Will not occur

Incompatibility: Polymerized by contact with water, alcohols, amines, alkalies.

Conditions to Avoid: Not available

Hazardous Decomposition Products (non-thermal): None

11. TOXICOLOGICAL INFORMATION

Estimated oral LD50 more than 5000 mg.kg.
Estimated dermal LD50 more than 2000 mg/kg.

12. ECOLOGICAL INFORMATION

No data available

13. DISPOSAL CONSIDERATIONS

Recommended methods of disposal: After polymerization as above, incinerate following EPA and local regulations.

EPA Hazardous Waste Number: NH - Not a RCRA Hazardous Waste Material

14. TRANSPORTATION INFORMATION

DOT (49 CFR 172)

Domestic Ground Transport

Proper Shipping Name: Unrestricted (Not more than 450 liters); Combustible liquids, n.o.s. (Cyanoacrylate ester) (More than 450 liters)

Hazard Class or Division: Unrestricted (Not more than 450 liters) Combustible liquid (More than 450 liters)

Identification Number: None (Not more than 450 liters); NA 1993 (More than 450 liters)

Marine Pollutant: None

IATA

Proper Shipping Name: Unrestricted (Not more than one pint); Aviation regulated liquid, n.o.s., (Cyanoacrylate Ester) (More than one pint)

Class or Division: Unrestricted (Not more than one pint); Class 9 (More than one pint)

UN or ID Number: None (Not more than one pint) UN 3334 (More than one pint)

Product Name: Loctite(R) Black Max(R) 380 Black Tough Inst Adh
Item No.: 38050

15. REGULATORY INFORMATION

CA Proposition 65: No California Proposition 65 chemicals are known to be present.

16. OTHER INFORMATION

Estimated NFPA(R) Code:
- Health Hazard: 2
- Fire Hazard: 2
- Reactivity Hazard: 1
- Specific Hazard: Does not apply

Estimated HMIS(R) Code:
- Health Hazard: 2*
- Flammability Hazard: 2
- Reactivity Hazards: 1
- Personal Protection: See Section 8.

NFPA is a registered trademark of the National Fire Protection Assn.
HMIS is a registered trademark of the National Paint and Coatings Assn.

Prepared By: Stephen Repetto
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MATERIAL SAFETY DATA SHEET

Product Name: Loctite(R) Black Max(R) 380 Black Tough Inst Adh
Item No.: 38050

Supplement

INFORMATION FOR FIRST AID AND CASUALTY ON TREATMENT FOR ADHESION OF HUMAN SKIN TO ITSELF IF CAUSED BY CYANOACRYLATE ADHESIVES

Cyanoacrylate adhesive is a very fast setting and strong adhesive. It bonds human tissue including skin in seconds. Experience has shown that accidents due to cyanoacrylates are handled best by passive, nonsurgical first aid. Treatment of specific types of accidents are given below.

SKIN CONTACT

Remove excess adhesive. Soak in warm, soapy water. The adhesive will come loose from the skin in several hours. Cured adhesive does not present a health hazard even when bonded to the skin.

Avoid contact with clothes, fabrics, rags, or tissue. Contact with these materials may cause polymerization. The polymerization of large amounts of adhesive will generate heat causing smoke, skin burns, and strong, irritating vapors. Wear nitrile or polyethylene gloves and apron when handling large amounts of adhesive.

SKIN ADHESION

First immerse the bonded surfaces in warm, soapy water. Peel or roll the surfaces apart with the aid of a blunt edge, e.g. a spatula or a teaspoon handle; then remove adhesive from the skin with soap and water. Do not try to pull surfaces apart with a direct opposing action.

EYELID TO EYELID OR EYEBALL ADHESION

In the event that eyelids are stuck together or bonded to the eyeball, wash thoroughly with warm water and apply a gauze patch. The eye will open without further action, typically in 1-4 days. There will be no residual damage. Do not try to open the eyes by manipulation.

ADHESIVE ON THE EYEBALL

Cyanoacrylate introduced into the eyes will attach itself to the eye protein and will disassociate from it over intermittent periods, generally covering several hours. This will cause periods of weeping until clearance is achieved. During the period of contamination, double vision may be experienced together with a lachrymatory effect, and it is important to understand the cause and realize that disassociation will normally occur within a matter of hours, even with gross contamination.

MOUTH

If lips are accidentally stuck together, apply lots of warm water to the lips and encourage maximum wetting and pressure from saliva inside the mouth. Peel or roll lips apart. Do not try to pull the lips

Supplement

with direct opposing action.

It is almost impossible to swallow cyanoacrylate. The adhesive solidifies and adheres in the mouth. Saliva will lift the adhesive in one half to two days. In case a lump forms in the mouth, position the patient to prevent ingestion of the lump when it detaches.

BURNS
Cyanoacrylates give off heat on solidification. In rare cases a large drop will increase in temperature enough to cause a burn. Burns should be treated normally after the lump of cyanoacrylate is released from the tissue as described above.

SURGERY
It should never be necessary to use such a drastic method to separate accidentally bonded skin.