

30-22001
30-22006



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

Brandhurst, Inc.
ATTN: Mr. Ronald Harper
87 Sand Pit Road
Danbury, Connecticut 06810

JUN 26 1985

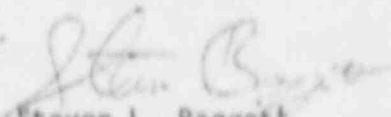
Dear Mr. Harper:

Based on the information submitted by your letter dated January 8, 1985 we have concluded that your tritium light source designs (S, CT, CC, RT, RC, DA, and DR) are acceptable for licensing purposes in accordance with the conditions of the attached certificate of registration.

Please be advised that distribution of these sources is dependent upon receipt of your amended License No. 31-20726-01.

If you have any questions, please contact me at (301) 427-9005.

Sincerely,


Steven L. Baggett
Material Licensing Branch
Division of Fuel Cycle and
Material Safety

Enclosure:
Certificate No. NR-196-S-103-S

cc: Ms. Jenny Johansen, (RI) w/encl.

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06-20804-01 PDR

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REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE

NO: NR-196-S-103-S

DATE: JUN 25 1985

PAGE: 1 of 5

MODEL: S, CT, CC, RT, RC, DA, DE

DISTRIBUTOR:

Brandhurst Incorporated
87 Sand Pit Road
Danbury, Connecticut 06810

Brandhurst Company, Ltd.
P.O. Box 70
Wellington Road, High Wycombe
Buckinghamshire HP 123PS, England

ISOTOPE: Hydrogen 3

MAXIMUM ACTIVITY: 15 curies

LEAK TEST FREQUENCY: Not required

PRINCIPAL USE: (w) Gaseous Tritium Light Devices, Self-Illuminating

CUSTOM DEVICE: _____ YES _____ ☒ NO

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DESCRIPTION:

Microlights-tritium activated light sources are laser sealed borosilicate glass capsules coated internally with a phosphor and filled with tritium gas. Tritium is an isotope of hydrogen which emits low energy beta radiation which excites phosphor causing it to emit visible light. The wavelength and color of the light depends upon the make-up of the phosphor and can vary from red (603-618 nms) to blue (450-48 nms). Note: nms = nanometers

The brightness of microlights is varied by the tritium content; they are filled at pressures up to 2.5 atmospheres to achieve maximum brightness. The light output level of any microlight may be greatly increased by painting the unexposed surface with reflective white paint.

A comprehensive range of shapes and sizes are manufactured by either machine or hand blown techniques. The range in dimensions for each source can be seen on the attached diagrams.

Below is a list of Model Numbers and Title for the source designs covered by this document:

<u>MODEL</u>	<u>TITLE</u>
CT	Cylindrical Light Source
DA	Axial Disc Light Source
DR	Radial Disc Light Source
S	Spherical Light Source
RC	Curved Light Source
CC	Curved Light Source
RT	Rectangular Light Source

LABELING:

Labeling of individual sources is impractical. The sources are placed into equipment which is to be properly labeled. The manufacturer marks and labels each shipping package or container.

DIAGRAMS:

See attachments 1 through 7.

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CONDITIONS OF NORMAL USE:

The gaseous tritium light sources will be assembled into safety signs and markers and various military optical equipment for the illumination of dials, graticules, etc.

PROTOTYPE TESTING:

All microlights manufactured are subjected to a 24 hour deionized water soak test for leakage or surface contamination. A sample of the soak water is tested by liquid scintillation techniques to determine that the detectable tritium does not exceed 0.050 uCi per source. Any light source exceeding this level is rejected.

Before Final Inspection all microlights are thoroughly washed using a radiological de-contaminant and rinsed off with water.

American National Standard No. N540 pre-supposes the environmental conditions which GTLS must withstand. The requirements for temperature and thermal shock are specified by the inherent properties of borosilicate glass tubing and confirmed by the thermal cycles encountered during the manufacturing process for GTLS outlined above. Similarly, during the manufacture the GTLS are subjected to reduced pressure conditions more severe than that specified in N540.

Since unmounted GTLS will only be distributed to Specific Licensees for assembly into complete devices, the N540 vibration and impact test requirements are, from a safety stand-point, best met by performing such tests on the completed device.

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QUALITY CONTROL AND ASSURANCE:

The manufacturers Production Quality Control procedures for gaseous tritium light sources only permit a maximum leakage of 0.050 microcuries over a 24 hour period per light source and a maximum tritium oxide content of 1%.

All goods received which are either for inclusion in a manufactured item or for use in a manufacturing process must be examined and approved by the Quality Controller before use.

The person receiving the incoming goods should (a) sign any delivery notes as "unexamined", (b) notify the Quality Controller of the receipt of the goods and give him any delivery notes.

No incoming goods should be used unless approved for use by the Quality Controller.

The Quality Controller will examine the incoming goods and then notify the relevant Department Supervisor if approved or not. He will arrange for the removal to the relevant department of any goods approved and for the return of the rejected goods to the supplier.

A file will be kept which will record the delivery dated, quantity and approval or rejection of all material received. Specifications will be kept on the front of the card indicating the type of material.

A raw material reject note and supplier complaint will be issued for any rejected material.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

- o The Brandhurst Incorporated Models S, CT, CC, RT, RC, DA and DR Gaseous Tritium Light Sources (GTLs) shall be distributed only to persons specifically licensed by the Nuclear Regulatory Commission or an Agreement State.
- o Handling, storage, use, transfer, and disposal: To be determined by the licensing authority.
- o Devices containing these sources shall have been tested to demonstrate the ability of the device to protect the source and user prior to distribution of the device.

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LIMITATION AND/OR OTHER CONSIDERATIONS OF USE:

- o This registration sheet and the information contained within the references shall not be changed or transferred without the written consent of the Nuclear Regulatory Commission.

SAFETY ANALYSIS SUMMARY:

Based on our review of the information and test data cited below, we conclude that the Brandhurst Incorporated Models S, CT, CC, RT, RC, DA, and DR Gaseous Tritium Light Sources designs are acceptable for licensing purposes. Furthermore, we conclude that these sources would be expected to maintain their containment integrity for normal conditions of use and accidental conditions which might occur during uses specified in this certificate.

REFERENCES:

The following supporting documents for the Brandhurst incorporated Models S, CT, CC, RT, RC, DA, and DR Gaseous Tritium Light Sources and hereby incorporated by reference and are made a part of this registry document:

- o Brandhurst Incorporated letter dated January 8, 1985.

ISSUING AGENCY:

U. S. Nuclear Regulatory Commission

DATE: JUN 25 1985

DATE: JUN 25 1985

REVIEWER:

Steven Bagley

CONCURRENCE:

Joseph M. Brown, Jr.

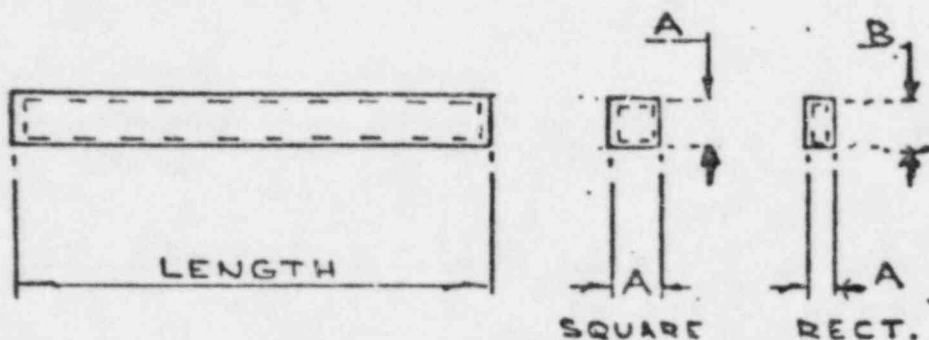
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE

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DATE:

ATTACHMENT 1

Source Type RT



	MIN	MAX
DIMENSION A	0.6 MM	6 MM
DIMENSION B	1.5 MM	16 MM
LENGTH	3 MM	250 MM
WALL THICKNESS	0.15 MM	2 MM
FILLING PRESSURE	-	2.5 BAR
TRITIUM CONTENT	-	15 Ci.

TITLE. RECTANGULAR.
LIGHT SOURCE

BRANDHURST CO. LTD.
WELLINGTON ROAD.
HIGH WYCOMBE, BUCKS

DRG. No.

P1663

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE

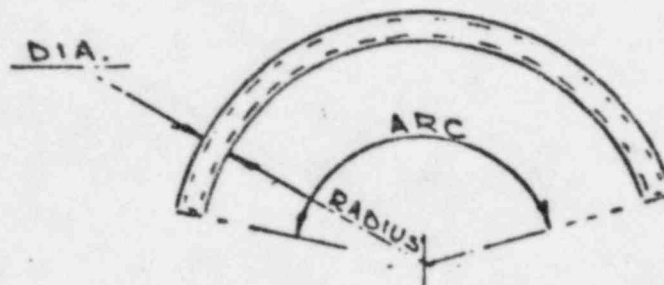
NO: NR-196-S-103-S

DATE:

JUN 25 1985

ATTACHMENT 2

Source Type CC



	MIN.	MAX.
DIAMETER	2 MM	7 MM
RADIUS	5 MM	250MM
ARC	5°	310°
WALL THICKNESS	0.4MM	1.5MM
FILLING PRESSURE	—	2.5BAR
TRITIUM CONTENT	—	15 CI

TITLE. CURVED
LIGHT SOURCE

BRANDHURST CO. LTD.
WELLINGTON ROAD,
HIGH WYCOMBE, BUCKS.

DRG. No.
P1664

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE

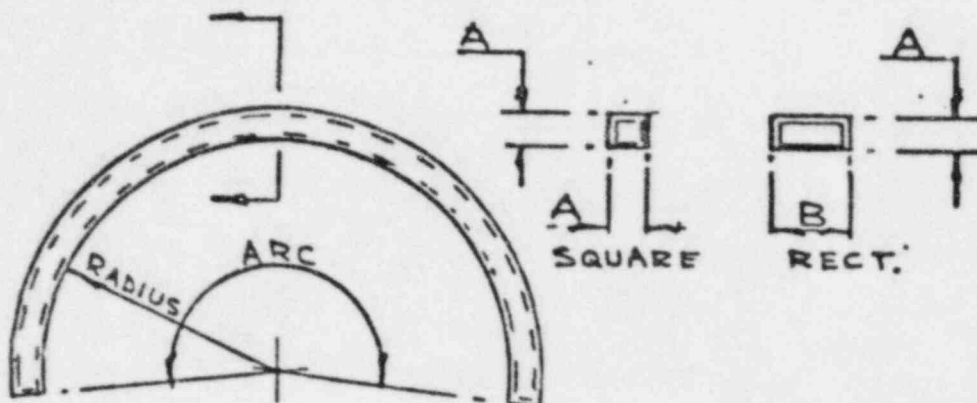
NO: NR-196-S-103-S

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ATTACHMENT 3

Source Type RC



	MIN	MAX
DIMENSION A	2MM	6MM
DIMENSION B	3MM	16MM
RADIUS	5MM	250MM
ARC	5°	310°
WALL THICKNESS	0.4MM	2MM
FILLING PRESSURE	-	2.5BAR
TRITIUM CONTENT	-	15Ci

TITLE. CURVED
LIGHT SOURCE

BRANDHURST CO. LTD.
WELLINGTON ROAD,
HIGH WYCOMBE, BUCKS.

DRG. No.

P1665

REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE

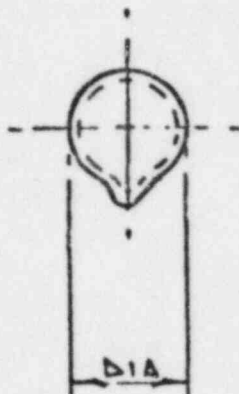
NO: NR-196-S-103-S

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ATTACHMENT 4

Source Type S



	MIN	MAX
DIAMETER	4 mm	20 mm
WALL THICKNESS	0.5 mm	1.0 mm
FILLING PRESSURE	-	2.5 BAR
TRITIUM CONTENT	-	15 Ci

TITLE. SPHERICAL.
LIGHT SOURCE

BRANDHURST CO. LTD.
WELLINGTON ROAD,
HIGH WYCOMBE, BUCKS

DRG. No.

P1659

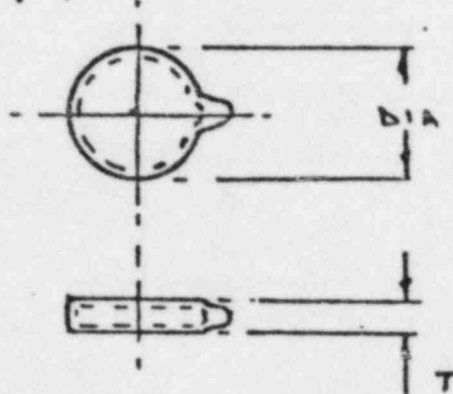
REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF SOURCE

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ATTACHMENT 5

Source Type DR



	MIN	MAX.
DIAMETER	4 mm	60 mm
THICKNESS T	2 mm	10 mm
WALL THICKNESS	0.5 mm	3 mm
FILLING PRESSURE	-	2.5 BAR
TRITIUM CONTENT	-	15 Ci

TITLE. RADIAL DISC.
LIGHT SOURCE

BRANDHURST CO. LTD.
WELLINGTON ROAD,
HIGH WYCOMBE, BUCKS.

DRG. No.

P1662



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

SOURCE AND DEVICE EVALUATION
TECHNICAL ASSISTANCE REQUEST

Date: April 24, 1985

To: Material Certification and Procedures Branch
7915 Eastern Avenue
Willste Building
Silver Spring, MD 20910

From: John Glenn/Jenny Johansen *John E. Glenn*
Region 1
Phone number 488-1260/488-1215

License Control Number: 103413

License Number (if applicable): 06-20804-01

Letter/Application dated: January 8, 1985

Assistance Requested:

☐ Custom Source Review

☒ Custom Device Review

☒ New Source Review

☐ New Device Review

☐ Amendment to Registry Sheet No. _____

☐ Other (see remarks below)

remarks: _____

XXX Catalog has been checked. No information is available on the source/device,

☒ Source will be imported.

0 Device will be imported.

0 _____

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