

030-30356

LPL 28138

NRC FORM 213
(7-86)
10 CFR 30.32, 33, 34,
35 and 40

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED BY ONE
2160-D120
Expires 5-31-87

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.

APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NM55
WASHINGTON, DC 20545

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:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIALS SAFETY SECTION B
601 PARK AVENUE
KING OF PRUSSIA, PA 19406

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
NUCLEAR MATERIALS SAFETY SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA,
NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH,
OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON,
AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS
TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
NUCLEAR MATERIALS SAFETY SECTION
1480 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

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 JURISDICTION.

1. THIS IS AN APPLICATION FOR (Check appropriate item)

- A. NEW LICENSE
- B. AMENDMENT TO LICENSE NUMBER _____
- C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code)

ANGELO BROTHERS COMPANY
10981 DECATUR ROAD
PHILADELPHIA, PA 19154

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

SEE 2 ABOVE

9001170338 881115
REG1 LIC30

PDR

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

LOUIS KUCHLER - VICE-PRESIDENT/PURCHASING

TELEPHONE NUMBER

215-632-9600

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. See Appendix pgs. 5 & 6

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.
See Appendix, p. 6

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE
Not Applicable

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS
See Appendix, p. 5

9. FACILITIES AND EQUIPMENT.
See Appendix p. 4

10. RADIATION SAFETY PROGRAM.
See Appendix pgs. 4 & 5

11. WASTE MANAGEMENT.
See Appendix p. 5

12. LICENSEE FEES (See 10 CFR 170 and Section 170.37)
FEE CATEGORY: 1 app. - New license
AMOUNT ENCLOSED \$ 290.00

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, 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 OF JUNE 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.

SIGNATURE - CERTIFYING OFFICER <i>Louis Kuchler</i>	TYPED/PRINTED NAME Louis Kuchler	TITLE Vice-President	DATE 12/23/87
--	-------------------------------------	-------------------------	------------------

14. ANNUAL RECEIPTS		14. VOLUNTARY ECONOMIC DATA	
<input checked="" type="checkbox"/> <\$250K	\$1M-3.5M	b. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors) 400	d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (Dollar and/or staff hours) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (NRC regulations permit it to protect confidential commercial or financial proprietary information furnished to the agency in confidence) <input type="checkbox"/> YES <input type="checkbox"/> NO
<input type="checkbox"/> \$250K-500K	\$3.5M-7M	c. NUMBER OF BEDS N/A	
<input type="checkbox"/> \$500K-750K	\$7M-10M		
<input type="checkbox"/> \$750K-1M	>\$10M		

FOR NRC USE ONLY			
TYPE OF FEE APP	FEE LOG Gen. 1 HQ	FEE CATEGORY 3I, 3P	COMMENTS "OFFICIAL RECORD COPY" ML18
AMOUNT RECEIVED \$520	CHECK NUMBER 29413	APPROVED BY <i>L. Kimberly</i>	DATE 12/23/87
		28 DEC 1987	

APPENDIX TO SPECIFIC LICENSE FOR
EXEMPT BYPRODUCT MATERIAL

1. Background of Application

A. Type of Application

Angelo Brothers Co. is hereby formally requesting a specific license to initially transfer for sale or distribution in the United States products containing exempt byproduct material. This application is made pursuant to 42 U.S.C. §§ 2111 (1982) and 10 C.F.R. 30.3, 30.15, and 32.14 (1987). The subject of this license is a compact fluorescent lamp containing an electron tube in the form of a glow starter. The electron tube is within the class of products specifically exempted from certain licensing requirements by operation of 10 C.F.R. § 30.15(a)(8) because it contains less than 30 microcuries of promethium-147 (Pm-147) and radiation levels do not exceed 1 millirad per hour at a distance of 1 centimeter when measured through 7 milligrams per square of centimeter absorber.

Angelo Brothers Co. requests that this license encompass the electron tube itself and a self-ballasted compact fluorescent lamp containing the tube.

B. Products to be Licensed

1. Electron Tube

The electron tube is designed to function as a glow starter in a compact fluorescent lamp. There are two electrodes in the glow starter, one is radioactive and the other is bi-metal mounted non-radioactive.

The radioactive electrode is comprised of non-radioactive iron and nickel alloy rod plated with Pm-147. And yet that surface is plated with non-radioactive Ni-58.

Each radioactive electrode contains a maximum of 0.5 microcuries of Pm-147, so, each electron tube contains a maximum 0.5 microcuries of Pm-147.

The outer envelope of the electron tube consists of soda-lime glass, 0.45-0.55 mm. thick, which is fused to close each end and form like a peanut, approximately 31.5 mm max. long and 10 mm. max. in diameter.

The electron tube will not operate if the seal is imperfect or the glass envelope is cracked or otherwise compromised.

2. The Compact Fluorescent Lamp

The tube is mounted in the compact fluorescent lamp. The tube is completely enclosed with hard plastic or metal cover. These covers further serve to protect the tube.

C. Production and Shipping

The compact fluorescent lamp is built for Angelo Brothers by Toshiba Corporation. The electron tube is also built by Toshiba Corporation. The electrodes used in the tube are manufactured for Toshiba by Nemoto and Co. an unrelated company.

The compact fluorescent lamps are initially distributed in the United States by Angelo Brothers Co. The company distributes the tubes as component of compact fluorescent lamp. Angelo Brothers distributes the compact fluorescent lamps to dealers and distributors and unrelated companies.

II. Section 32.14--Requirements for Issuance of a Specific License for Distribution of Certain Items Containing Exempt Byproduct Material

A. Section 32.14(a)--General Requirements for Issuance of a Specific License (§30.33)

1. Application for a Purpose Authorized by the Act.

The stated purpose of the Atomic Energy Act of 1954, as amended, (the Act) is to regulate the development of atomic energy so as to encourage its peaceful uses, 1/ including uses that will strengthen free competition in private enterprise, 2/ encourage the development of the atomic energy industry, 3/ and encourage maximum scientific and industrial progress. 4/ In addition, section 2111 of the Act classifies "industrial use" as a useful application.

Angelo Brothers's distribution of the electron tube makes effective industrial use of the byproduct material Pm-147 in a manner that facilitates modern illuminations, constitutes a peaceful application of

atomic energy, and strengthens free competition and private enterprise, thus encouraging both the further development of the atomic energy industry and maximum scientific and industrial progress within the meaning of the Act.

2. Adequate Equipment and Facilities

The applicant's electron tubes are tested individually by the manufacturer. They will not operate, and are rejected, if the glass envelope is intact. The radiation emitted by the amount of Pm-147 on an electrode does not penetrate the intact glass tube.

The compact fluorescent lamps are packed for shipping in bubble wrap or other appropriate packaging designed to protect against breakage. As previously stated, the plastic or metal glove and cover increase the protection of the tube.

A periodic random sample of compact fluorescent lamps is subjected to drop tests designed to ensure the tubes will survive the conditions of shipping and handling. No tube has been known to break during such testing.

1/ 42 U.S.C. §§ 2011, 2013 (1982).

2/ 42 U.S.C. § 2011 (1982).

3/ 42 U.S.C. § 2012 (1982).

4/ 42 U.S.C. § 2013 (1982).

Angelo Brothers's warehouses have in-rack sprinkler systems, which are in full compliance with insurers' standards and offer exceptional protection against fire. The warehouses also incorporate modern security systems to prevent theft or tampering.

3. Training and Experience for Handling of Compact Fluorescent Lamps

Angelo Brothers has been in the lamp business for many years, and employees are experienced in the proper handling, shipping, and storage of lamps requiring special care, such as compact fluorescent lamps.

It should be noted that the Nuclear Regulatory Commission (NRC) regulations recognize that electron tubes containing less than 30 microcuries of Promethium-147 are items of relatively small concern in terms of health and safety, since they are exempted from certain licensing requirements under 10 C.F.R. 15(a)(8) (1987). Nevertheless, all Angelo Brothers personnel will be informed of the existence of byproduct material in the compact fluorescent lamps and will receive instruction in proper handling of the lamps, including clean-up and disposal procedures in case of breakage. All waste disposal will meet or exceed NRC and applicable state regulations.

B. Section 32.14(b)(1)--[Application Item 5]
--Radioactive Material

The radioactive material contained in the electron tube is Promethium-147. The Promethium-147 is a solid plated on an electrode composed of iron and nickel alloy (non-radioactive).

And yet surface of the electrode is electroplated with non-radioactive Ni-58. The maximum quantity per electron tube is 0.5 microcuries.

C. Section 32.14(b)(2)--[Application Item 6]--Purpose for Which Licensed Material will be Used

The licensed material will be contained in an electron tube which will function as a glow starter in the compact fluorescent lamp. The compact fluorescent lamps may be imported and distributed by Angelo Brothers

D. Section 32.14(b)(2)- Details of Construction

A drawing of the glow starter is attached hereto as Attachment 1.

Glass:	Soda lime
Dimensions:	As shown in drawing
Glass Thickness:	0.45-0.55 mm.

Sealing is achieved by fusing the ends of the glass of each tube together utilizing heat followed by an annealing process.

A drawing of the compact fluorescent lamp containing the glow starter is attached as Attachment 2.

E. Section 32.14(b)(3)--Method of Containment or Binding

The Promethium-147 is bound to the iron-nickel alloy iod by means of electroplating. For the details of the method of containment by means of the glass bulb, see Section D, above. When contained in the compact fluorescent lamp the electron tubes are enclosed by the hard plastic or metal material.

This enclosure would minimize or prevent any exposure to the environment in the extremely unlikely event of breakage of the electron tube or the glow starter.

F. Section 32.14(b)(4)--Procedures for and Results of Prototype Testing.

Toshiba Corporation subjects a random sample of the glow starter and the fluorescent lamp containing the glow starter to drop tests in the prototype. These tests are designed to replicate the most severe conditions likely to be encountered, i.e., shipping or handling of the product. No break in the glow starter has been experienced as a result of these tests, and consequently, there has been no release of the nuclear byproduct material to the environment.

G. Section 32.14(b)(5)--Quality Control Procedures to be Followed in the Fabrication of Production Lots and Quality Control Standards

A schematic diagram showing all quality control procedures utilized by Toshiba Corporation in the fabrication of the electron tube is contained in Attachment 3.

With respect to the electrode itself, a random sample is undertaken by Nemoto and Co. of 10 in every 10,000 units to determine the amount of Promethium-147 per electrode. Toshiba Corporation test lights every electron tube as an individual electron tube. Any electron tube not lighting, as in the case of a break would be rejected.

Toshiba Corporation test lights every compact fluorescent lamp as an individual compact fluorescent lamp before shipment to the United States. Each such inspection to be conducted in accordance with 32.110 (1). Any faulty compact fluorescent lamp will not be shipped and be returned to Toshiba Corporation or disposed of, in every instance in accordance with applicable federal and/or state law.

H. Section 32.14(b)(6)--Labeling

Each individual carton of the compact fluorescent lamp will be labeled or printed as follows:

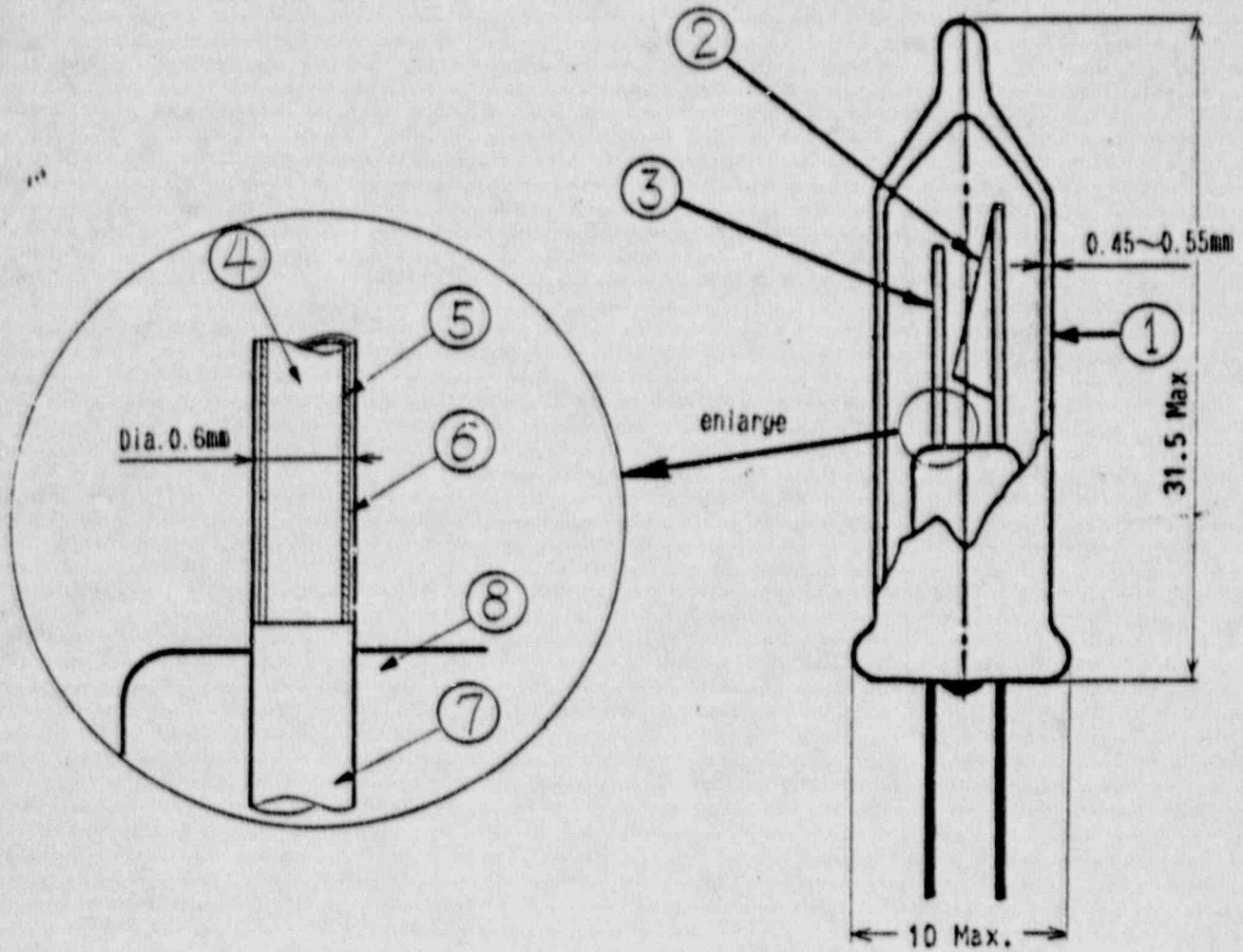
Distributed by
Angelo Brothers Co.
Pm147

I. Section 32.14(b)(6)--Radiation Level and Method of Measurement

The level of radiation from the electron tube both individually and as contained within each compact fluorescent lamp is zero.

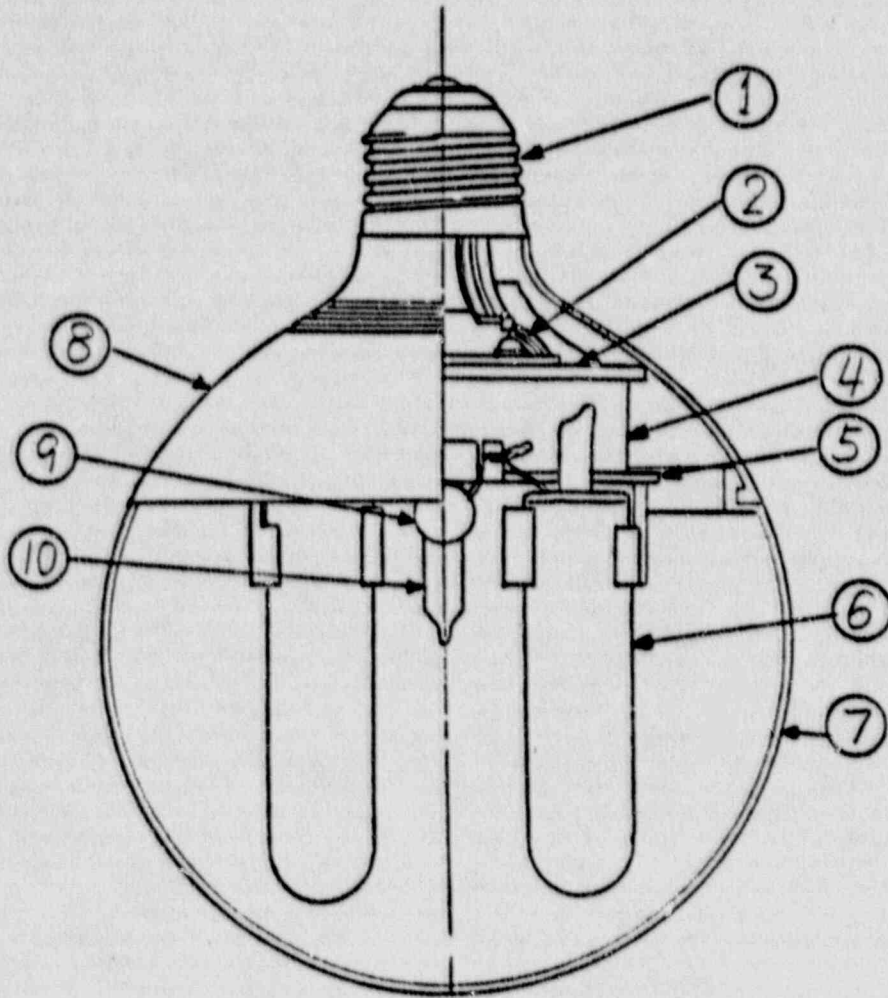
Attachment 1

GLOW STARTER BOTTLE
CONSTRUCTION



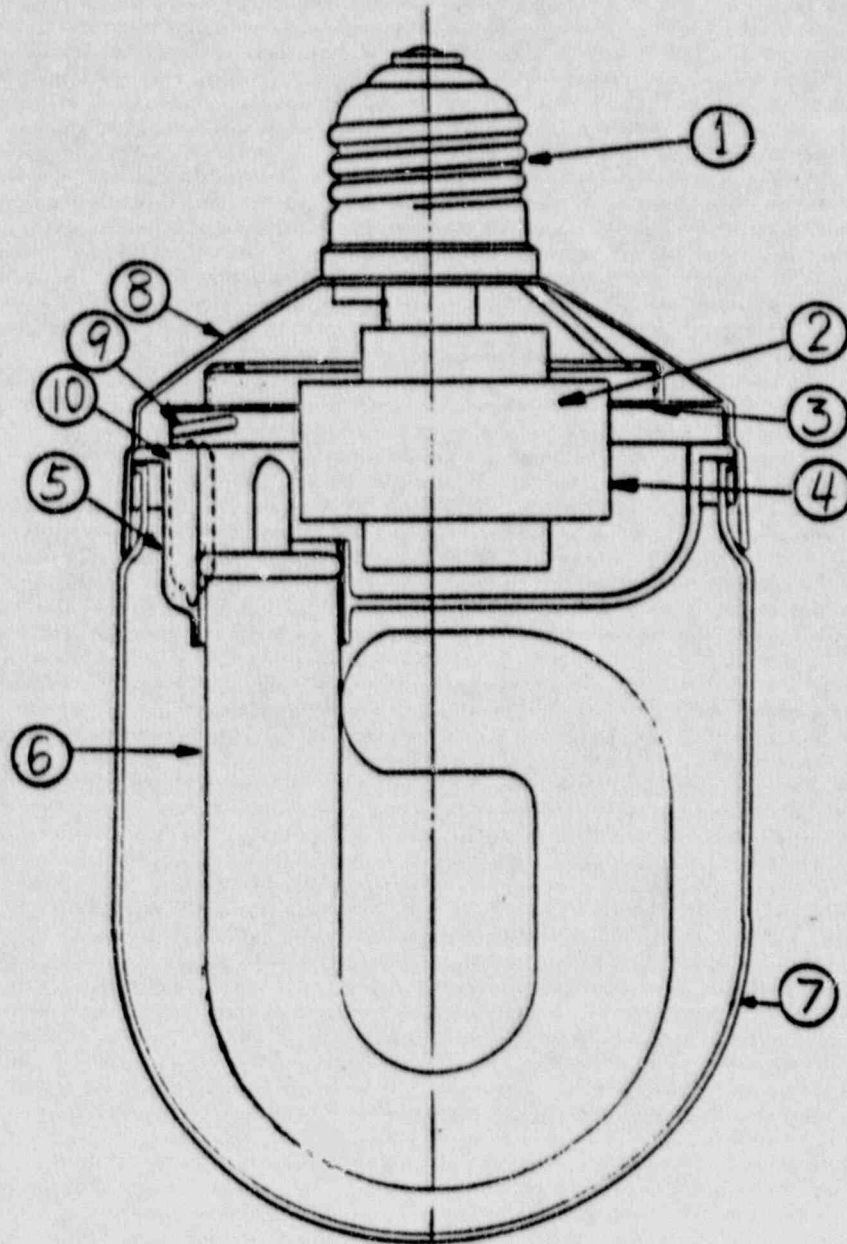
No.	PART NAME
1.	Glow starter bottle
2.	Bi-metal electrode (non-radioactive)
3.	Radioactive electrode
4.	Fe-Ni alloy wire (non-radioactive)
5.	Pm147 (Radioactive, Electroplating)
6.	Ni58 (non-radioactive Electroplating)
7.	Dumet wire (non-radioactive)
8.	Glass stem

COMPACT FLUORESCENT LAMP
CONSTRUCTION
(BFG-16)



NO.	PART NAME
1	Screw base
2	Ballast
3	Classis
4	Ballast case
5	Starter holder
6	Inner bulb
7	Globe
8	Cover
9	Capacitor
10	Glow starter bottle

COMPACT FLUORESCENT LAMP
CONSTRUCTION
(BFT-16).



NO.	PART NAME
1	Screw base
2	Ballast
3	Chassis
4	Ballast case
5	Starter holder
6	Inner bulb
7	Globe
8	Cover
9	Capacitor
10	Glow starter bottle

Attachment 3

Glow Starter (Quality Control Procedure)

Flow Chart	Manufacturing Process	Control Items	Control Object
<p>The flowchart is a vertical sequence of 17 steps, each represented by a symbol: a downward-pointing triangle for start, a square for a process step, and a circle for a check point. The symbols are connected by a vertical line with horizontal branches to the left for branching points. The steps are: Bead Tube (triangle), Tube Cutting (square), Welds (triangle), Bi-metal (Electrode) (triangle), Mounting (square), Mount Check (circle), Activator (triangle), Activator dipping (square), Bulb Tube (triangle), Tube Cutting (square), Bulb Making (circle), Sealing (circle), Gas Filling (triangle), Exhausting (square), Discharge Check (square), Aging (circle), Characteristic Inspection (square), Packing (circle), Shipment Inspection (square with diagonal line), and Shipment (triangle).</p>	Bead Tube		
	Tube Cutting	Length	Quality Check
	Welds		
	Bi-metal (Electrode)		
	Mounting		
	Mount Check	Electrode Gap	Quality Check
		Back Tension	
	Activator		
	Activator dipping		
	Bulb Tube		
	Tube Cutting	Length	M/C Check
	Bulb Making		
	Sealing		
	Gas Filling		
	Exhausting		
		Gas Pressure	
		Exhaust Level	M/C Check
	Discharge Check		
	Aging		
		Lamp Test	JIS
Characteristic Inspection			
Packing			
Shipment Inspection			
Shipment			

Attachment 4

TOSHIBA Glow Starter Quality Standard

(for Compact Self-ballasted Fluorescent Lamp use)

Item	Specification	Sampling	Testing Measure
Starting Time (sec) (at 180V)	Max. 15	n=20 c=0 per lot per day	Electrical Testing Device
Dead Time (sec) (at 108V)	0.4~2.0		
Pre-heat Time (sec) (at 120V)	Min. 0.5		
Breakdown Voltage (V)	Min. 72 Max. 106		
Non Re-closure Voltage (V)	Min. 72 (not reclose within 60 sec)		
Life Test	Min. 6000 times (25 sec. on-30 sec. off)	n=10 c=0 per lot per month	Life Tester
Endurance Test	Min. 5 (continuously on and off)	n=10 c=0 per lot per month	Endurance Tester
Appearance Inspection	start on and off normally at 108V	n=315 c=2 per lot per day	Electrical Testing Device

Attachment 5

Compact Fluorescent Lamp (Quality Control Procedure)

Flow Chart	Manufacturing Process	Control Item	Control Object
	<p>Bulb Phosphor Inner bulb coating Baking Mount Sealing Bending</p> <p>Amalgam Filling gas Inner bulb exhausting Inner bulb inspection</p> <p>Ballast Ballast case Chassis Starter holder Glow starter bottle Capacitor Cover Screw base Globe Assembly Aging Inspection</p> <p>Packing Out going inspection Out going</p>	<p>Transmission Temperature</p> <p>Length Temperature Dimensions</p> <p>Gas pressure Exhaust level Unlighting Appearance</p> <p>Aging schedule Unlighting Appearance</p> <p>Characteristic</p>	<p>Quality check Quality check</p> <p>Quality check Quality check</p> <p>Quality check Quality check</p> <p>Quality check</p> <p>Quality check Quality check</p> <p>Quality check Quality check</p> <p>JEL</p>

TOSHIBA Compact Self-ballasted Fluorescent Lamp
Quality Standard (Finished Lamp)

Item	Specification	Sampling	Testing Measure
Starting time (sec)	Max. 7 (at 95% Rated voltage)	n-3. c-0 per lot per day	Electrical and Photometric Testing Device
Lamp Current (mA)	265 ± 20 (BFG120V16) 270 ± 15 (BFT120V16)		
Lamp Wattage (W)	(16) (nominal)		
Luminous Flux (Lm)	670 ± 70 (BFG120V16) 750 ± 70 (BFT120V16)		
Lighting Appearance Inspection	Light normally at 94% Rated voltage	n-80. c-0 per lot per day	Inspection Test Device
Torsion Test (N · m)	Withstand at 3.0 N · m torque	n-3. c-0 per month	Torsion Tester
Drop Test (Packing Case)	70 cm height	n-30. c-0 per month	Drop Tester
Life (hours)	6000 (BFG120V16) 9000 (BFT120V16)	n-3. c-0 per month	Life Tester

108170

"OFFICIAL RECORD COPY" ML10

Angelo Brothers Company
ATTN: Mr. Louis Kuchler
Vice President
10981 Decatur Road
Philadelphia, PA 19154

JAN 20 1988

Gentlemen:

This refers to your application dated December 23, 1987, for a materials license for possession and distribution of electron tubes.

Your application referenced the enclosure of a \$290 fee, which we did not receive. However, application fees totalling \$520 are required as specified in fee Categories 3I (\$290) and 3P (\$230) of §170.31 10 CFR 170, copy enclosed. Fee Category 3I pertains to the distribution of the items and fee Category 3P pertains to receipt and possession of the items. Payment should be made to the U.S. Nuclear Regulatory Commission and mailed to my attention at our Washington, D.C. address.

Your application will be sent to the Licensing staff for processing upon receipt of the \$520 fee. When submitting the fee, please refer to CONTROL NUMBER 108170.

Sincerely,

Signed by:

Glenda Jackson

Glenda Jackson
License Fee Management Branch
Division of Accounting and Finance
Office of Administration and
Resources Management

Enclosure:
10 CFR 170

DISTRIBUTION:

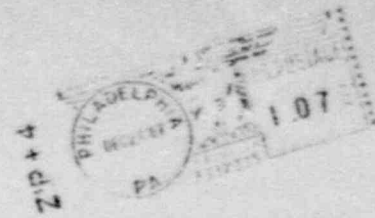
Pending Fee File
ARM/DAF R/F
LFMB R/F (2)
DW/RI/Angelo Bros

OFFICE: ARM/LFMB *AK*
SURNAME: SKimberley:rej
DATE: 1/15/88

ARM/LFMB *8*
GJackson
1/19/88

Angelo
SERVICES COMPANY

10981 Decatur Road - Philadelphia - Pennsylvania 19154-3297



U. S. NUCLEAR REGULATORY COMMISSION
REGION I
ATTN: JOHN E. GLENN, PH.D.
NUCLEAR MATERIALS SAFETY AND SAFEGUARDS BRANCH
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

New
28 DEC 1987

030-30356

L & L

28138

NRC FORM 213
(7-86)
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APPROVED BY ONE
3150-0120
Expires 6-31-87

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NUCLEAR MATERIALS SAFETY SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30320

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U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

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MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

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NUCLEAR MATERIALS SAFETY SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

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C. RENEWAL OF LICENSE NUMBER _____

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10981 DECATUR ROAD
PHILADELPHIA, PA 19154

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED:

SEE 2 ABOVE

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION: LOUIS KUCHLER - VICE-PRESIDENT/PURCHASING

TELEPHONE NUMBER: 215-632-9600

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11. WASTE MANAGEMENT. See Appendix p. 5	12. LICENSEE FEES (See 10 CFR 170 and Section 170.31) FEE CATEGORY: 1 app. - New license AMOUNT ENCLOSED \$ 290.00

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, 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 OF JUNE 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.

SIGNATURE—CERTIFYING OFFICER <i>Louis Kuchler</i>	TYPED/PRINTED NAME Louis Kuchler	TITLE Vice-President	DATE 12/23/87
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14. VOLUNTARY ECONOMIC DATA		15. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (Dollar and/or staff hours) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)
A. ANNUAL RECEIPTS	B. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors)	
C. NUMBER OF BEDS		
<input checked="" type="checkbox"/> <\$250K	<input type="checkbox"/> \$1M-3.5M	<input type="checkbox"/> YES
<input type="checkbox"/> \$250K-500K	<input type="checkbox"/> \$3.5M-7M	<input type="checkbox"/> NO
<input type="checkbox"/> \$500K-750K	<input type="checkbox"/> \$7M-10M	
<input type="checkbox"/> \$750K-1M	<input type="checkbox"/> >\$10M	
	N/A	

FOR NRC USE ONLY		APPROVED BY
TYPE OF FEE	FEE LOG	DATE 108170
AMOUNT RECEIVED	CHECK NUMBER	
"SECTION COPY"		
28 DEC 1987		

APPENDIX TO SPECIFIC LICENSE FOR
EXEMPT BYPRODUCT MATERIAL

I. Background of Application:

A. Type of Application

Angelo Brothers Co. is hereby formally requesting a specific license to initially transfer for sale or distribution in the United States products containing exempt byproduct material. This application is made pursuant to 42 U.S.C. §§ 2111 (1982) and 10 C.F.R. 30.3, 30.15, and 32.14 (1987). The subject of this license is a compact fluorescent lamp containing an electron tube in the form of a glow starter. The electron tube is within the class of products specifically exempted from certain licensing requirements by operation of 10 C.F.R. § 30.15(a)(8) because it contains less than 30 microcuries of promethium-147 (Pm-147) and radiation levels do not exceed 1 millirad per hour at a distance of 1 centimeter when measured through 7 milligrams per square of centimeter absorber.

Angelo Brothers Co. requests that this license encompass the electron tube itself and a self-ballasted compact fluorescent lamp containing the tube.

B. Products to be Licensed

1. Electron Tube

The electron tube is designed to function as a glow starter in a compact fluorescent lamp. There are two electrodes in the glow starter, one is radioactive and the other is bi-metal mounted non-radioactive.

The radioactive electrode is comprised of non-radioactive iron and nickel alloy rod plated with Pm-147. And yet that surface is plated with non-radioactive Ni-58.

Each radioactive electrode contains a maximum of 0.5 microcuries of Pm-147, so, each electron tube contains a maximum 0.5 microcuries of Pm-147.

The outer envelope of the electron tube consists of soda-lime glass, 0.45-0.55 mm. thick, which is fused to close each end and form like a peanut, approximately 31.5 mm max. long and 10 mm. max. in diameter.

The electron tube will not operate if the seal is imperfect or the glass envelope is cracked or otherwise compromised.

2. The Compact Fluorcent Lamp

The tube is mounted in the compact fluorescent lamp. The tube is completely enclosed with hard plastic or metal cover. These covers further serve to protect the tube.

C. Production and Shipping

The compact fluorescent lamp is built for Angelo Brothers by Toshiba Corporation. The electron tube is also built by Toshiba Corporation. The electrodes used in the tube are manufactured for Toshiba by Nemoto and Co. an unrelated company.

The compact fluorescent lamps are initially distributed in the United States by Angelo Brothers Co. The company distributes the tubes as component of compact fluorescent lamp. Angelo Brothers distributes the compact fluorescent lamps to dealers and distributors and unrelated companies.

II. Section 32.14--Requirements for Issuance of a Specific License for Distribution of Certain Items Containing Exempt Byproduct Material

A. Section 32.14(a)--General Requirements for Issuance of a Specific License (§30.33)

1. Application for a Purpose Authorized by the Act.

The stated purpose of the Atomic Energy Act of 1954, as amended, (the Act) is to regulate the development of atomic energy so as to encourage its peaceful uses, 1/ including uses that will strengthen free competition in private enterprise, 2/ encourage the development of the atomic energy industry, 3/ and encourage maximum scientific and industrial progress. 4/ In addition, section 2111 of the Act classifies "industrial use" as a useful application.

Angelo Brothers's distribution of the electron tube makes effective industrial use of the byproduct material Pm-147 in a manner that facilitates modern illuminations, constitutes a peaceful application of

atomic energy, and strengthens free competition and private enterprise, thus encouraging both the further development of the atomic energy industry and maximum scientific and industrial progress within the meaning of the Act.

2. Adequate Equipment and Facilities

The applicant's electron tubes are tested individually by the manufacturer. They will not operate, and are rejected, if the glass envelope is intact. The radiation emitted by the amount of Pm-147 on an electrode does not penetrate the intact glass tube.

The compact fluorescent lamps are packed for shipping in bubble wrap or other appropriate packaging designed to protect against breakage. As previously stated, the plastic or metal glove and cover increase the protection of the tube.

A periodic random sample of compact fluorescent lamps is subjected to drop tests designed to ensure the tubes will survive the conditions of shipping and handling. No tube has been known to break during such testing.

1/ 42 U.S.C. §§ 2011, 2013 (1982).
2/ 42 U.S.C. § 2011 (1982).
3/ 42 U.S.C. § 2012 (1982).
4/ 42 U.S.C. § 2013 (1982).

Angelo Brothers's warehouses have in-rack sprinkler systems, which are in full compliance with insurers' standards and offer exceptional protection against fire. The warehouses also incorporate modern security systems to prevent theft or tampering.

3. Training and Experience for Handling of Compact Fluorescent Lamps

Angelo Brothers has been in the lamp business for many years, and employees are experienced in the proper handling, shipping, and storage of lamps requiring special care, such as compact fluorescent lamps.

It should be noted that the Nuclear Regulatory Commission's (NRC) regulations recognize that electron tubes containing less than 30 microcuries of Promethium-147 are items of relatively small concern in terms of health and safety, since they are exempted from certain licensing requirements under 10 C.F.R. 15(a)(8) (1987). Nevertheless, all Angelo Brothers personnel will be informed of the existence of byproduct material in the compact fluorescent lamps and will receive instruction in proper handling of the lamps, including clean-up and disposal procedures in case of breakage. All waste disposal will meet or exceed NRC and applicable state regulations.

B. Section 32.14(b)(1)--[Application Item 5]
--Radioactive Material

The radioactive material contained in the electron tube is Promethium-147. The Promethium-147 is a solid plated on an electrode composed of iron and nickel alloy (non-radioactive).

And yet surface of the electrode is electroplated with non-radioactive Ni-58. The maximum quantity per electron tube is 0.5 microcuries.

C. Section 32.14(b)(2)--[Application Item 6]--Purpose for Which Licensed Material will be Used

The licensed material will be contained in an electron tube which will function as a glow starter in the compact fluorescent lamp. The compact fluorescent lamps may be imported and distributed by Angelo Brothers

D. Section 32.14(b)(2)--Details of Construction

A drawing of the glow starter is attached hereto as Attachment 1.

Glass:	Soda lime
Dimensions:	As shown in drawing
Glass Thickness:	0.45-0.55 mm.

Sealing is achieved by fusing the ends of the glass of each tube together utilizing heat followed by an annealing process.

A drawing of the compact fluorescent lamp containing the glow starter is attached as Attachment 2.

E. Section 32.14(b)(3)--Method of Containment or Binding

The Promethium-147 is bound to the iron-nickel alloy iod by means of electroplating. For the details of the method of containment by means of the glass bulb, see Section D, above. When contained in the compact fluorescent lamp the electron tubes are enclosed by the hard plastic or metal material.

This enclosure would minimize or prevent any exposure to the environment in the extremely unlikely event of breakage of the electron tube or the glow starter.

F. Section 32.14(b)(4)--Procedures for and Results of Prototype Testing.

Toshiba Corporation subjects a random sample of the glow starter and the fluorescent lamp containing the glow starter to drop tests in the prototype. These tests are designed to replicate the most severe conditions likely to be encountered, i.e., shipping or handling of the product. No break in the glow starter has been experienced as a result of these tests, and consequently, there has been no release of the nuclear byproduct material to the environment.

G. Section 32.14(b)(5)--Quality Control Procedures to be Followed in the Fabrication of Production Lots and Quality Control Standards

A schematic diagram showing all quality control procedures utilized by Toshiba Corporation in the fabrication of the electron tube is contained in Attachment 3.

With respect to the electrode itself, a random sample is undertaken by Nemoto and Co. of 10 in every 10,000 units to determine the amount of Promethium-147 per electrode. Toshiba Corporation test lights every electron tube as an individual electron tube. Any electron tube not lighting, as in the case of a break would be rejected.

Toshiba Corporation test lights every compact fluorescent lamp as an individual compact fluorescent lamp, before shipment to the United States. Each such inspection to be conducted in accordance with 32.110 (a). Any faulty compact fluorescent lamp will not be shipped and be returned to Toshiba Corporation or disposed of, in every instance in accordance with applicable federal and/or state law.

H. Section 32.14(b)(6)--Labeling

Each individual carton of the compact fluorescent lamp will be labeled or printed as follows:

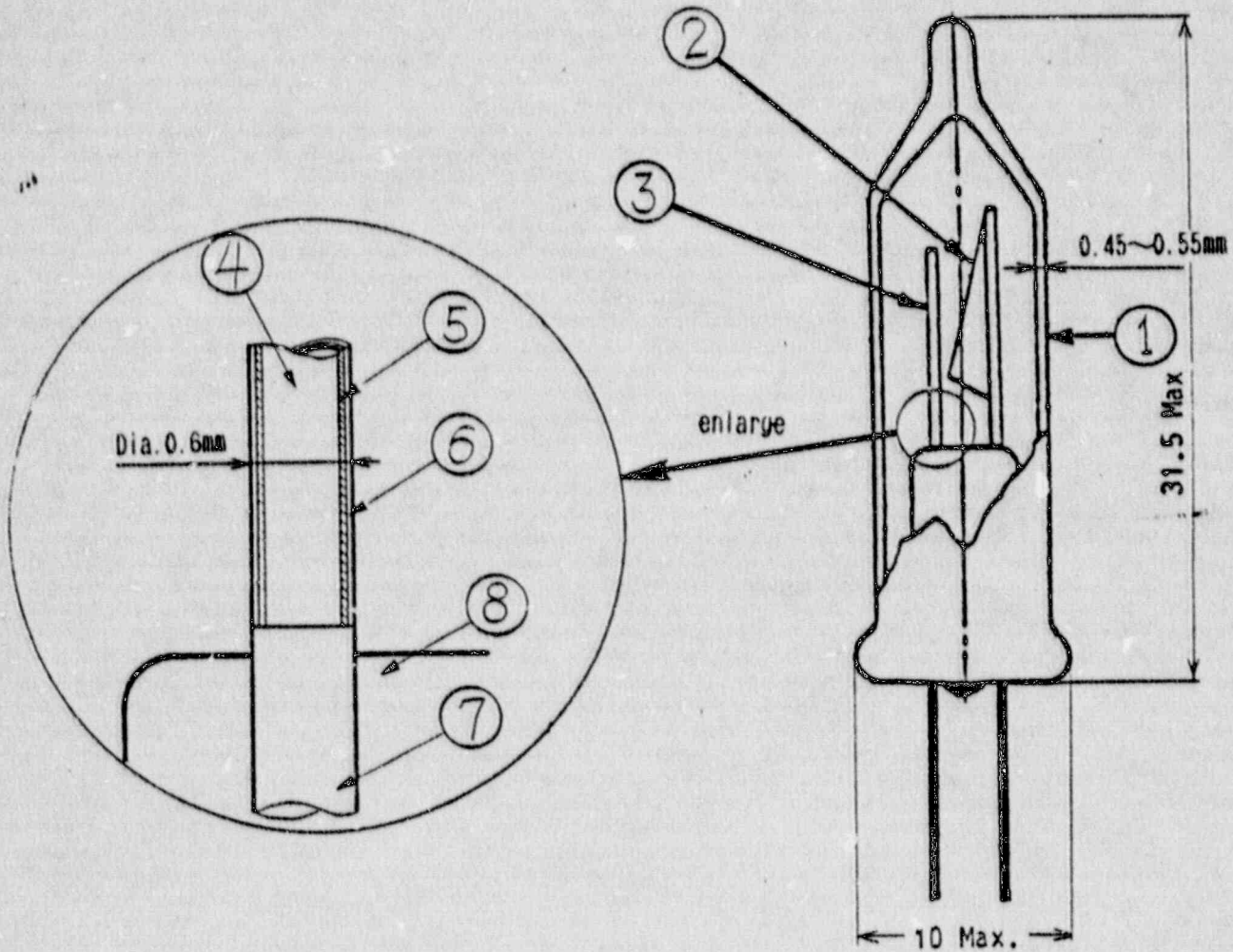
Distributed by
Angelo Brothers Co.
Pm147

I. Section 32.14(b)(6)--Radiation Level and Method of Measurement

The level of radiation from the electron tube both individually and as contained within each compact fluorescent lamp is zero.

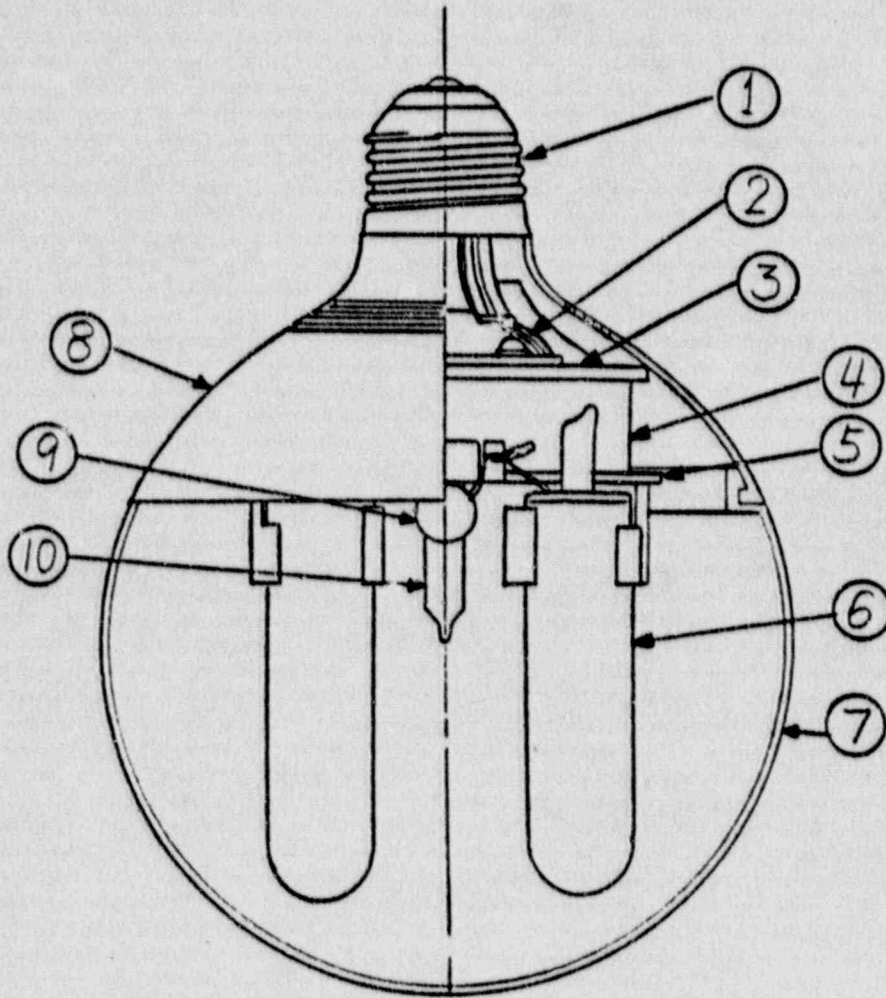
Attachment 1

GLOW STARTER BOTTLE
CONSTRUCTION



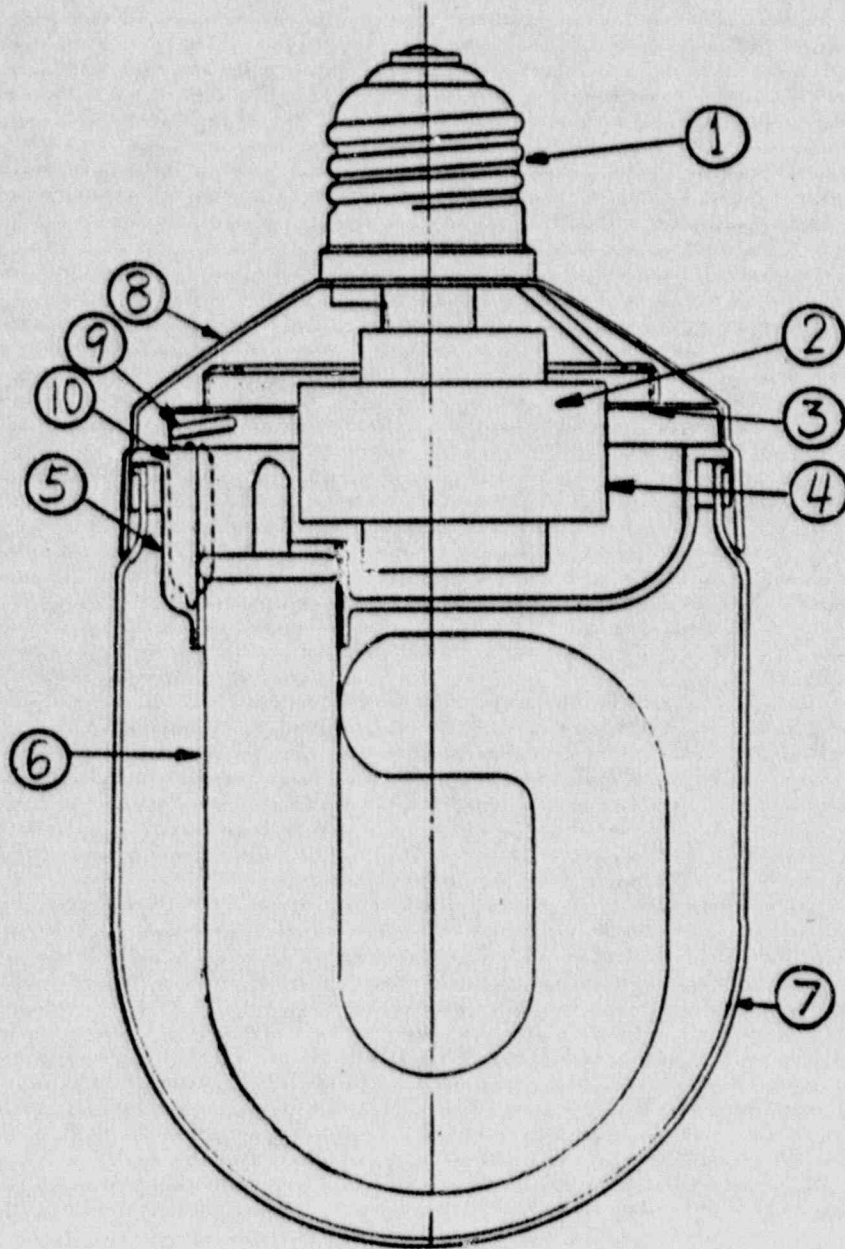
No.	PART NAME
1.	Glow starter bottle
2.	Bi-metal electrode (non-radioactive)
3.	Radioactive electrode
4.	Fe-Ni alloy wire (non-radioactive)
5.	Pm147 (Radioactive, Electroplating)
6.	Ni58 (non-radioactive, Electroplating)
7.	Dumet wire (non-radioactive)
8.	Glass stem

COMPACT FLUORESCENT LAMP
CONSTRUCTION
(BFG-16)



NO.	PART NAME
1	Screw base
2	Ballast
3	Chassis
4	Ballast case
5	Starter holder
6	Inner bulb
7	Globe
8	Cover
9	Capacitor
10	Glow starter bottle

COMPACT FLUORESCENT LAMP
CONSTRUCTION
 (BFT-16)



NO.	PART NAME
1	Screw base
2	Ballast
3	Classis
4	Ballast case
5	Starter holder
6	Inner tube
7	Globe
8	Cover
9	Capacitor
10	Glow starter bottle

Attachment 4

TOSHIBA Glow Starter Quality Standard

(for Compact Self-ballasted Fluorescent Lamp use)

Item	Specification	Sampling	Testing Measure
Starting Time (sec) (at 180V)	Max. 15	n=20 c=0 per lot per day	Electrical Testing Device
Dead Time (sec) (at 108V)	0.4~2.0		
Pre-heat Time (sec) (at 120V)	Min. 0.5		
Breakdown Voltage (V)	Min. 72 Max. 106		
Non Re-closure Voltage (V)	Min. 72 (net reclose within 60 sec)		
Life Test	Min. 6000 times (25 sec. on-30 sec. off)	n=10 c=0 per lot per month	Life Tester
Endurance Test	Min. 5 (continuously on and off)	n=10 c=0 per lot per month	Endurance Tester
Appearance Inspection	start on and off normally at 108V	n=315 c=2 per lot per day	Electrical Testing Device

Attachment 5

Compact Fluorescent Lamp (Quality Control Procedure)

Flow Chart	Manufacturing Process	Control Item	Control Object
	<p>Bulb Phosphor Inner bulb coating Baking Mount Sealing Bending Amalgam Filling gass Inner bulb exhausting Inner bulb inspection Ballast Ballast case Chassis Starter holder Glow starter bottle Capacitor Cover Screw base Globe Assembly Aging Inspection Packing Out going inspection Out going</p>	<p>Transmission Temperature Length Temperature Dimensions Gass pressure Exhaust level Unlighting Appearance Aging schedule Unlighting Appearance Characteristic</p>	<p>Quality check Quality check Quality check Quality check Quality check Quality check Quality check Quality check Quality check JEL</p>

TOSHIBA Compact Self-ballasted Fluorescent Lamp
Quality Standard (Finished Lamp)

Item	Specification	Sampling	Testing Measure
Starting time (sec)	Max. 7 (at 95% Rated voltage)	n=3. c=0 per lot per day	Electrical and Photometric Testing Device
Lamp Current (mA)	265 ± 20 (BFG120V16) 270 ± 15 (BFT120V16)		
Lamp Wattage (W)	(16) (nominal)		
Luminous Flux (lm)	670 ± 70 (BFG120V16) 750 ± 70 (BFT120V16)		
Lighting Appearance Inspection	Light normally at 94% Rated voltage	n=80. c=0 per lot per day	Inspection Test Device
Torsion Test (N·m)	Withstand at 3.0 N·m torque	n=3. c=0 per month	Torsion Tester
Drop Test (Packing Case)	70 cm height	n=30. c=0 per month	Drop Tester
Life (hours)	6000 (BFG120V16) 9000 (BFT120V16)	n=3. c=0 per month	Life Tester