REGISTRY OF RADIOACTIVE SEALED SOURCES AND DEVICES
SAFETY EVALUATION OF DEVICE

NO.: NR420D106U DATE: December 1, 1969

DEVICE TYPE: Vertical Teletherapy Unit

MODEL: Keleket-Barnes Flexaray

MANUFACTURER/DISTRIBUTOR: LFE Corporation
1601 Trapelo Road
Waltham, MA 02154

MANUFACTURER/DISTRIBUTOR:

SEALED SOURCE MODEL DESIGNATION:

ISOTOPE: Cobalt-60 MAXIMUM ACTIVITY: 4000 curies

LEAK TEST FREQUENCY:

PRINCIPAL USE: Medical Teletherapy

CUSTOM DEVICE: ___ YES _X_ NO

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DESCRIPTION:

The Keleket-Barnes Flexaray is a motor-driven floorstand teletherapy unit designed for stationary beam therapy. The unit can be ordered with a yoke as an optional feature. The treatment distance can be varied, beginning at 30 cm. The height of the source above the floor can be adjusted from 2'4" minimum to 6' maximum. The unit is 8' high and the distance between the source and the back of the unit is approximately 5'.

The unit normally uses a standard international teletherapy capsule and has been licensed for up to 4000 curies.

The unit may be supplied with a choice of two different heads. The Mark II, Model D head, is rated for 1500 rhm source and the Mark II, Model D-1, is rated for 3500 rhm. The head consists of a spherical cast steel shell filled with lead. A tungsten alloy disc inside the head provides additional shielding in the "off" position for the Model D-1 head. The source is seated in a cavity in the solid tungsten alloy source wheel and held in place by a lock ring. The system is designed so that the source wheel will be automatically returned to the "off" position by a return spring in the event of power failure.

The lead (and Tungsten) alloy collimation assembly defines a field size which can be varied from 2 square to a circular field 19 cm in diameter at 60 cm (about 18° maximum subtended angle).

The head will tilt forward 225° from the downward direction and back 45°. The yoke (optional) may rotate through an arc of 360°. Beam orientation in the two planes can be limited by microswitches.

A pointer on a hand wheel and lights on the control panel and inside the teletherapy room indicate the "on" and "off" conditions. The source wheel retracts to the "off" position by a return spring if the power fails or the door is opened, the unit must be reset to continue treatment. In an emergency, the indicating hand wheel at the rear of the head can be turned to return the source to the "off" position. The source cannot be moved to the "on" position by the hand wheel, however, because of a one way clutch.

There is no uranium in this unit.

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EXTERNAL RADIATION LEVELS:

Head leakage complies with NBS Handbook 73.

LIMITATIONS AND/OR OTHER CONSIDERATIONS OF USE:

Installation and source transfer are usually performed by Keleket X-Ray Division of Laboratories for Electronics, Inc., Waltham, Massachusetts, under its AEC License No. 20-1320-2. Source transfer involves exchanging the teletherapy source through the beam port utilizing a specially designed shipping container with two source pockets.

ISSUING AGENCY:

U.S. Atomic Energy Commission

SEALED SOURCE SHEET

MANUFACTURER & DISTRIBUTOR:

Tracerlab
Division of I.C.N. Corporation
1601 Trapelo Road
Waltham, Massachusetts 02154

USE:

Designed primarily for use in x-ray fluorescence analyzers and other laboratory devices.

Isotope	Maximum Activity (mCi)	Capsule Designations
Cd 109	10	RXA, RXB, RXC
Fe 55	15	RXA, RXB, RXC
Am 241	10	RXA, RXB, RXC
Am 241	30	RXL, RXM, RXN

For their own administrative purposes, the manufacturer will identify sources using a designation which identifies the source capsule type, isotope and activity. For example, an RXA-Am-10 source would contain 10 millicuries of americium 241.

CONSTRUCTION:

The cadmium and iron sources are electroplated on copper foil and annealed in a hydrogen atmosphere. The Americium is deposited as the nitrate onto an Al_2O_3 pellet and vacuum dried. Capsules are constructed by cementing an aluminum or beryllium window to a Monel body using eccobond 276 epoxide binder. The radioactive source is placed against the window in the capsule and a rear plug is heliarc welded to the body.

	Dimensions (Inches)		
Capsule*	Length	Diameter	Wall Thickness
RXA and RXL	0.2	0.32	0.06
RXB and RXM	0.2	0.43	0.1
RXC and RXN	0.2	0.6	0.1

*Note: RXA, RXB and RXC capsules have 4 mil Be windows
RXL, RXM and RXN capsules have 40 mil Al windows

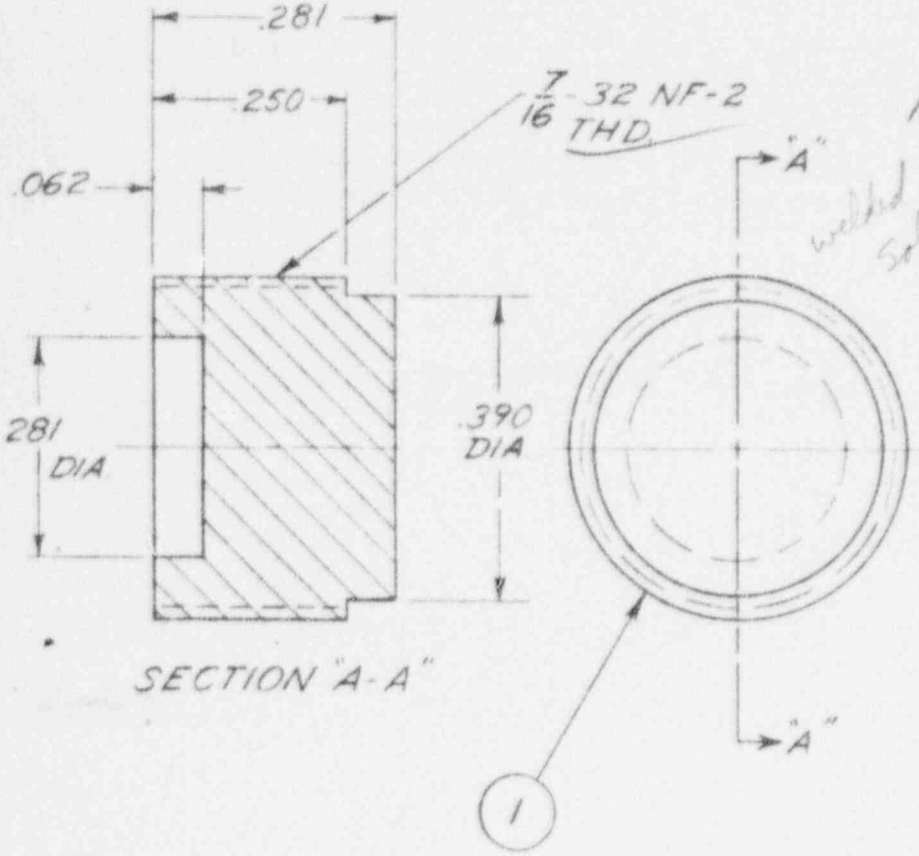
PROTOTYPE TESTING:

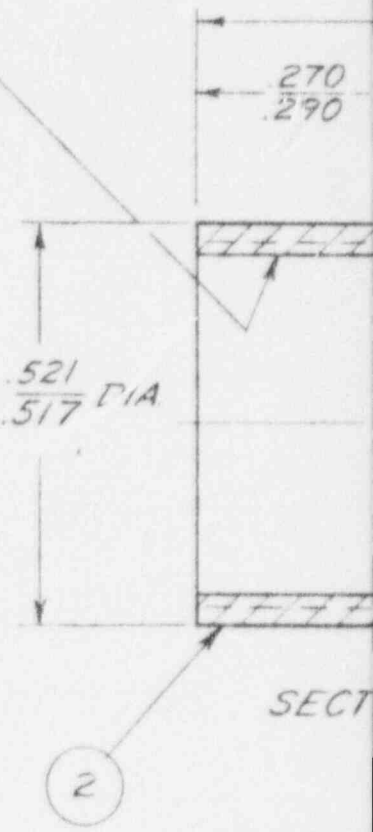
These sources have been tested in accordance with USASI N5.10 1968 and have been classified as C-32231. In addition, the manufacturer has performed special tests to verify that the eccobond 276 epoxide binder retains its adhesive properties after being irradiated with up to 3×10^6 Rads.

LABELING:

The isotope, activity and serial number will be engraved on each source.

The outer container in which the source is packaged will contain the same information and will in addition include: date, radiation symbol, words "Caution, Radioactive Material," and the name of the manufacturer.





SECT

1. USE I
USING
2. TRIM
3 HELI
4. PART
FINAL
5. FINAL
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REVISIONS		
1	1ST RELEASE	9/9/69

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B X-2

PARTS LIST

QTY	PART NUMBER	DESCRIPTION	ITEM NO
1	PER THIS DWG.	"PLUG" ("R" MONEL ROD)	1
1	" " "	"BODY" " " "	2
1	" " "	"WINDOW" .0010 ± .0002 THK MONEL SHEET OR STRIP	3

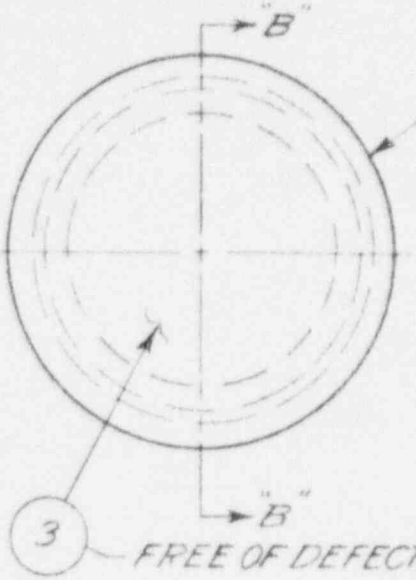
.500

.030 / .028

.402 / .404 DIA

.030 / .028

ON "B-B"



ENGRAVE SERIAL NO, ISOTOPE, AMT. OF ACTIVITY, IN 1/16" HIGH LETTERS ON OUTSIDE DIA.

FREE OF DEFECTS

NOTES:

DUCTION HEATING TO BRAZE ITEM 3 TO ITEM 2 IN HYDROGEN ATMOSPHERE HANDY & HARMAN "NE SOLDER WITHOUT FLUX.

/INDOW TO DIAMETER.

A LEAK TEST FOR LEAKS.

HOULD BE CAPABLE OF WITHSTANDING TEMP. OF 1475°F FOR 10 MIN. AT ASSY.

CAPSULE ASSY. UTILIZES RADIOACTIVE FOIL, PLACED WITH ACTIVITY Y AGAINST WINDOW.

ALL DIMENSIONS DO NOT INCLUDE PLATING

TOLERANCES UNLESS OTHERWISE SPECIFIED				
FRACTIONAL	DECIMAL	ANGULAR	USED ON	MODEL
± 1/64"	± .005	± 1/2°		

SCALE 4X

MATERIAL SPECIFICATIONS

KIND	SEE
FINISH	PARTS
SIZE	LIST
DRAWN	9 SEPT '69 RLP
CHECKED	
APPR'D	

DO NOT SCALE DRAWING

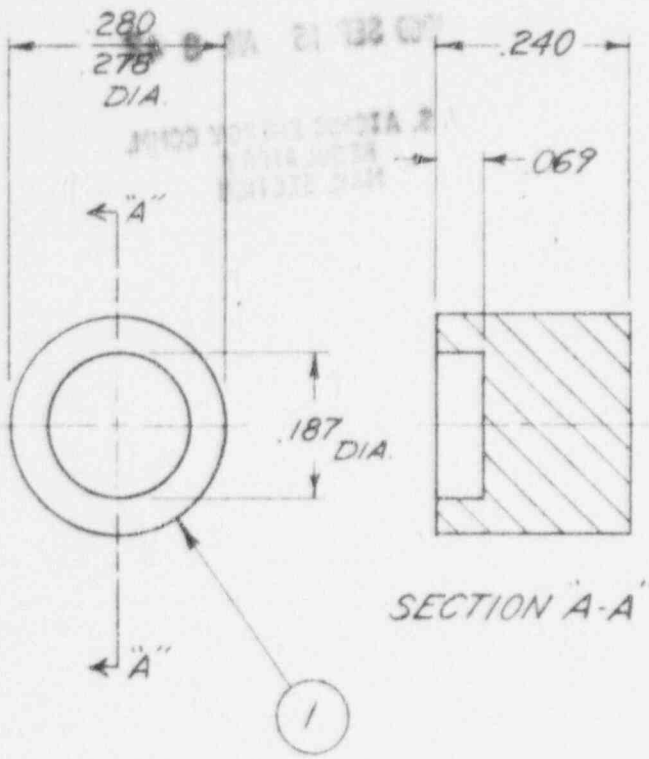
TRACERLAB
TECHNICAL PRODUCTS
DIVISION OF ICN INC.

NAME: SOURCE CAPSULE DETAILS

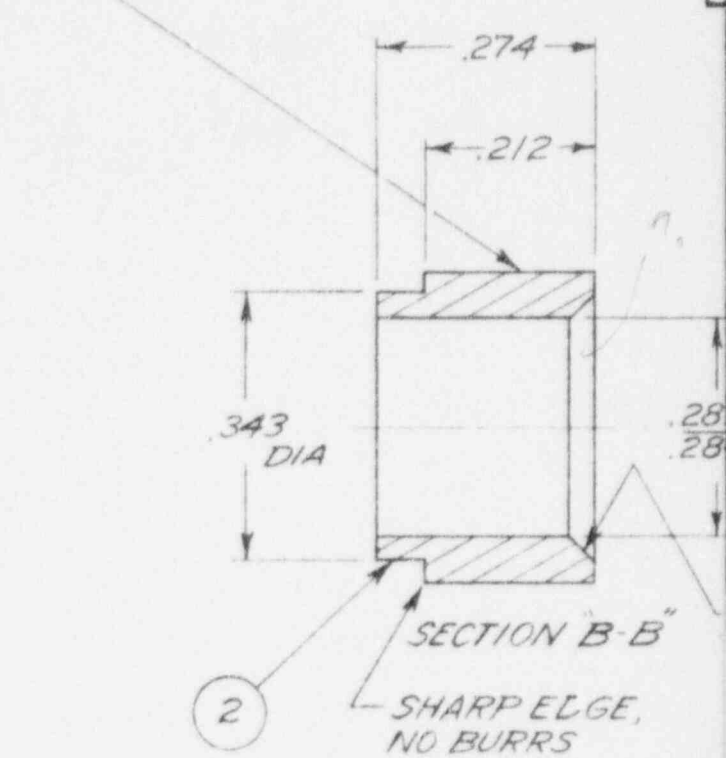
DRAWING NO. B X-2

REV 1

9702240145-01



SECTION "A-A"



SECTION "B-B"

REVISIONS

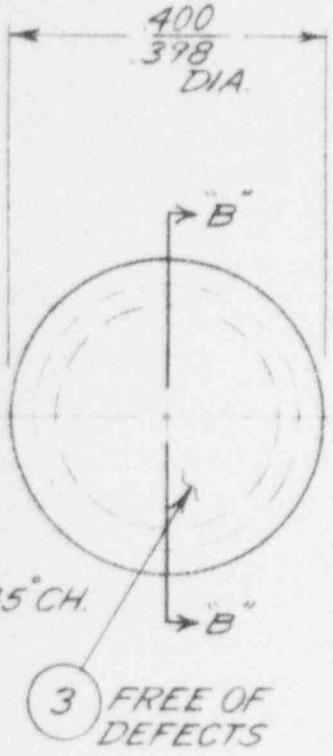
1	1ST RELEASE	9/13/69

9 10 11 12 13 14 15 16

B X-1

PARTS LIST

QTY	PART NUMBER	DESCRIPTION	ITEM NO
1	PER THIS DWG.	"PLUG" ("R" MONEL ROD)	1
1	" " "	"BODY" " " "	2
1	" " "	"WINDOW" .0010" ± .0002" THK. MONEL SHEET OR STRIP	3



NOTES:

1. USE INDUCTION HEATING TO BRAZE ITEM 3 TO ITEM 2 IN HYDROGEN ATMOSPHERE USING "HANDY & HARMAN" NE SOLDER WITHOUT FLUX.
2. TRIM WINDOW TO DIAMETER.
3. HELIUM LEAK TEST FOR LEAKS.
4. PART SHOULD BE CAPABLE OF WITHSTANDING TEMP. OF 1475°F FOR 10 MIN. AT FINAL ASSY.
5. FINAL CAPSULE ASSY. UTILIZES RADIOACTIVE FOIL, PLACED WITH ACTIVITY DIRECTLY AGAINST WINDOW.

fixing activity within source?
how is it all within ⑤?

ALL DIMENSIONS DO NOT INCLUDE PLATING

TOLERANCES UNLESS OTHERWISE SPECIFIED				
FRACTIONAL	DECIMAL	ANGULAR		
~	± .005"	± 1/2°	USED ON	MODEL

SCALE	4 X
MATERIAL SPECIFICATIONS	
KIND	SEE
FINISH	PARTS
SIZE	LIST
DRAWN	8 SEPT 69 RLP
CHECKED	
APPR'D	

DO NOT SCALE DRAWING

TRACERLAB
TECHNICAL PRODUCTS
DIVISION OF ICN INC.

NAME: SOURCE CAPSULE DETAILS

DRAWING NO.: B X-1

REV.: 1

9702240145-02