

LEAD INDUSTRIES ASSOCIATION

422 LEXINGTON AVENUE

NEW YORK 17, N. Y.

January 16, 1956

LEAD SHIELDING BULLETIN NO. 4

SUBJECT: RADIOISOTOPE CONTAINERS
USED BY OAK RIDGE NATIONAL LABORATORY

To Members of the Lead Industries Association:

The Oak Ridge National Laboratory, operated by Union Carbide and Carbon Corporation for the U. S. Atomic Energy Commission, recently published a booklet detailing the construction of approved radioisotope shipping containers. Special permission for reproduction of this booklet was given to the Lead Industries Association.

The containers described in the booklet are used for about 98 percent of the shipments of radioactive products from Oak Ridge in the form of liquids, irradiated solids or gases. At the present time about 90 percent of the shipments are made in disposable tin cans or fiberboard box containers utilizing distance as the principal shielding factor. At higher energy levels and on all returnable containers, lead shielding is employed from 1/2 in. thick upward. Higher energies than those covered in the booklet are almost always shipped in lead protected containers, designed in most cases, especially for the application.

Additional copies of this booklet are available as long as our supply lasts.

Very truly yours,

W. R. Snyder
Secretary



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RADIOISOTOPE CONTAINERS

USED BY

OAK RIDGE NATIONAL LABORATORY

OAK RIDGE NATIONAL LABORATORY
Owned by
CARBIDE AND CARBON CHEMICALS COMPANY
A Division of Union Carbide and Carbon Corporation
Post Office Box P
Oak Ridge, Tennessee

N3075.01

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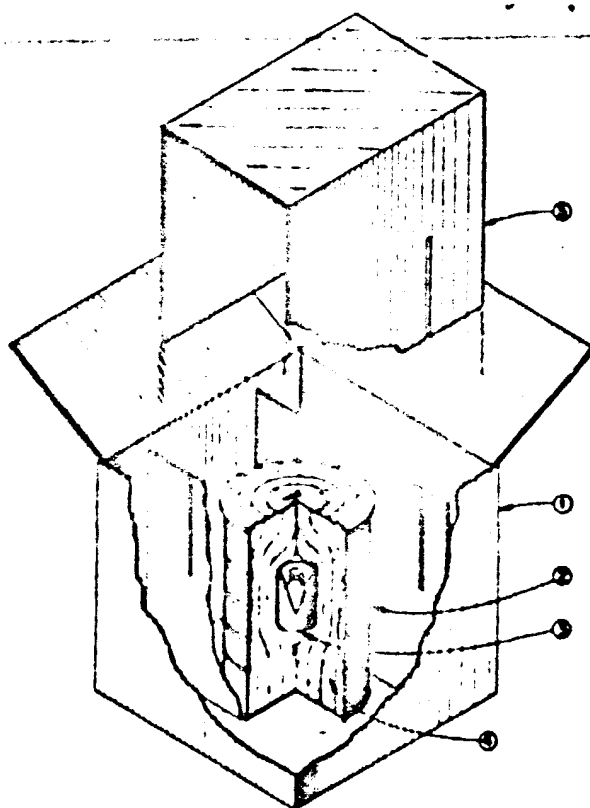
RADIOISOTOPE SHIPPING CONTAINERS

The containers described in the accompanying table and sketches are used for about 98% of the shipments of products which are in a liquid form, solids irradiated and shipped in standard aluminum irradiation cans, and gases. The remaining 2%, not described, covers a great variety of containers designed for use in shipment of special products.

At the present time, approximately 90% of the shipments are made in disposable tin can and fiberboard box containers. A large portion of these shipments are made without the addition of any lead shielding although lead shielding, up to $\frac{1}{2}$ inch, is used. The use of these disposable containers has appreciably reduced the shipping costs to the customers, and decontamination, surveying, maintenance and handling costs to the Laboratory.

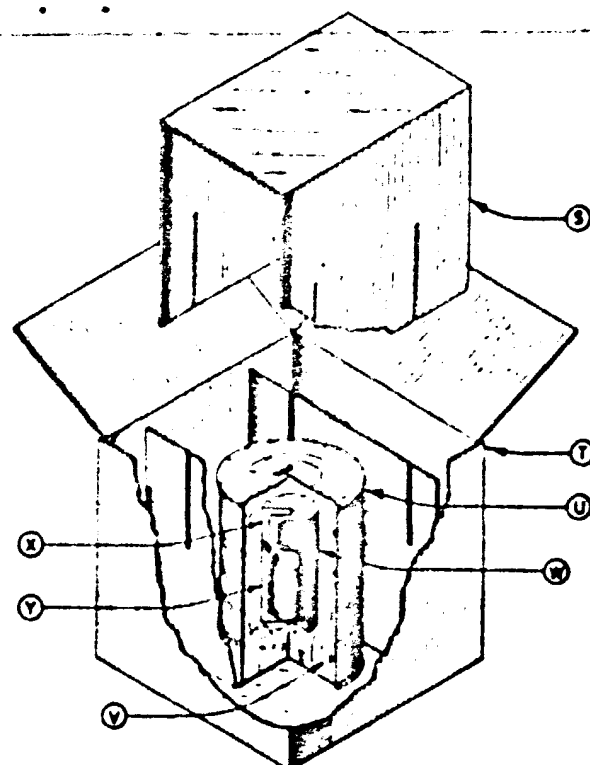
No attempt has been made to describe many containers, still in use, which are obsolete but similar in design to the ones described.

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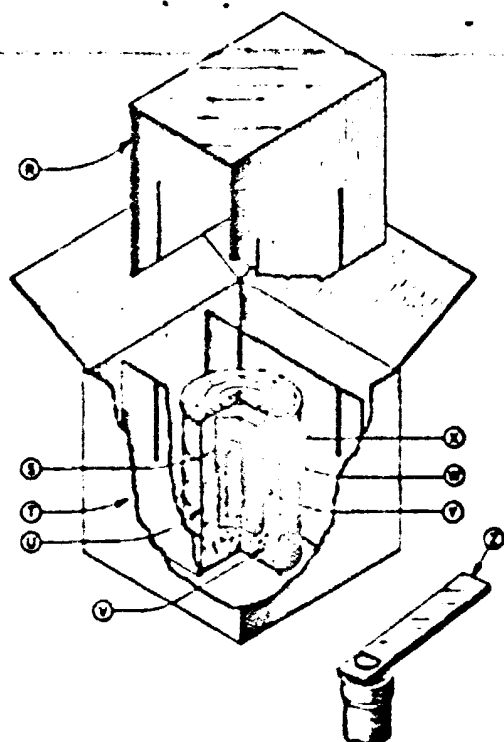
PART	NO.
FIBERBOARD BOX (200 lb. Type)	1
TIN CAN	2
FIBERBOARD TUBE	3
ABSORBENT WADDING	4
FIBERBOARD INSERT	5

FIGURE 1
DISPOSABLE CONTAINER FOR SEPARATED RADIOISOTOPES



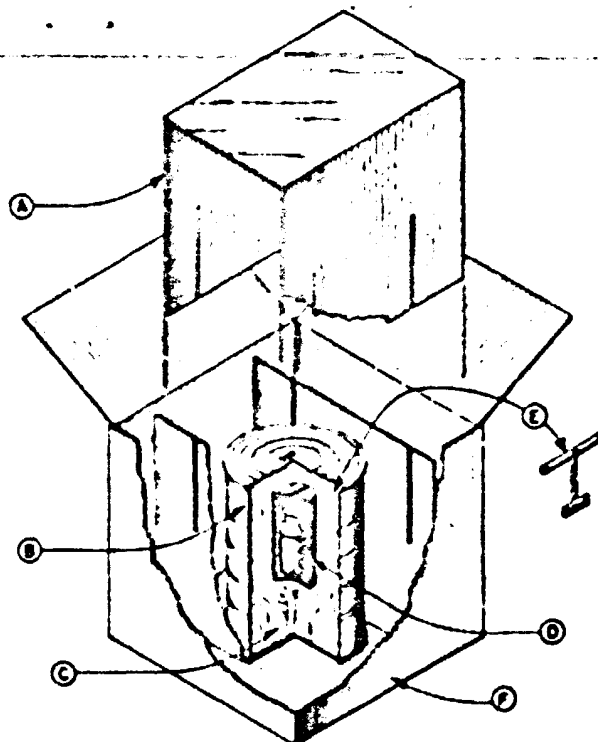
S FIBERBOARD INSERT
T FIBERBOARD BOX (200 lb. Type)
U TIN CAN
V ABSORBENT PAPER WADDING
W SCOTCH TAPE SEAL
X TOP SECTION LEAD CONTAINER
Y BOTTOM SECTION LEAD CONTAINER

FIGURE 2
DISPOSABLE CONTAINER FOR SEPARATED RADIONUCLIDES



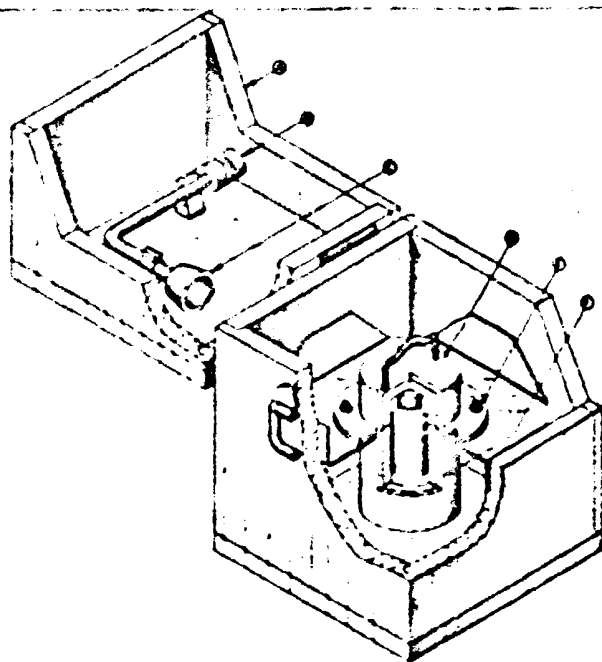
- B FIBERBOARD INSERT
- S ALUMINUM CAN
- T FIBERBOARD BOX (200 lb Test)
- U TIN CAN
- V ABSORBENT PAPER WADDING
- W SCOTCH TAPE SEAL
- X TOP SECTION OF LEAD CONTAINER
- Y BOTTOM SECTION OF LEAD CONTAINER
- Z DECAPPER

FIGURE 3
DISPOSABLE CONTAINER FOR UNSEPARATED RADIOISOTOPES
(Reactor Units)



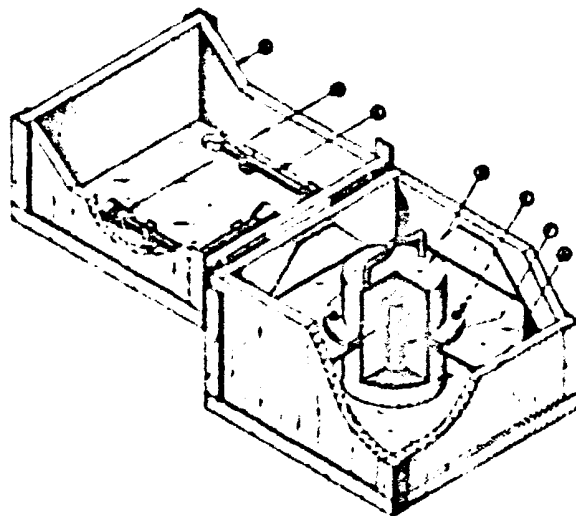
- A FIBERBOARD INSERT
- B TIN CAN
- C CELLULOSE WADDING
- D STAINLESS STEEL CUP
- E KEY
- F FIBERBOARD BOX (200 lb Test)

FIGURE 4
DISPOSABLE CONTAINER FOR EXTRA-HAZARDOUS SEPARATED
RADIOISOTOPES (Stainless Steel Cup and Key Returnable)



- A $\frac{3}{4}$ IN. PLYWOOD BOX
- B WRENCH
- C BOTTLE CAP REMOVER
- D TOP LEAD SHIELD
- E NUTS
- F BOTTOM LEAD SHIELD

FIGURE 5
RETURNABLE CONTAINERS FOR SEPARATED ISOTOPES



- | PART | QTY. |
|-------------------------------|------|
| $\frac{3}{4}$ IN. PLYWOOD BOX | A |
| WRENCH | B |
| DECAPPER | C |
| LEAD SHIELD (Top) | D |
| NUT | E |
| ALUMINUM CAN | F |
| LEAD SHIELD (Bottom) | G |

FIGURE 6
RETURNABLE CONTAINER FOR UNSEPARATED ISOTOPES (Reactor Unit)
FOR SMALLER QUANTITIES

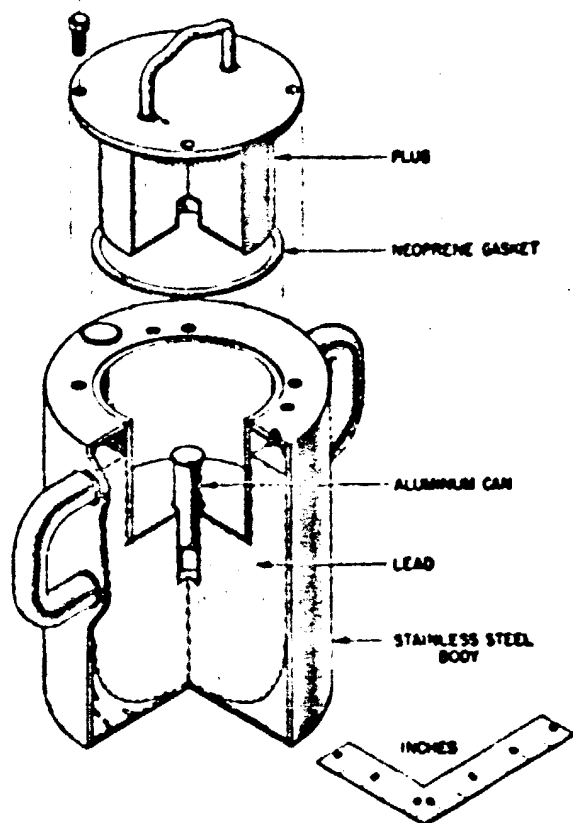


FIGURE 7
RETURNABLE CONTAINER FOR UNSEPARATED ISOTOPES (Reactor Units)
FOR LARGER QUANTITIES

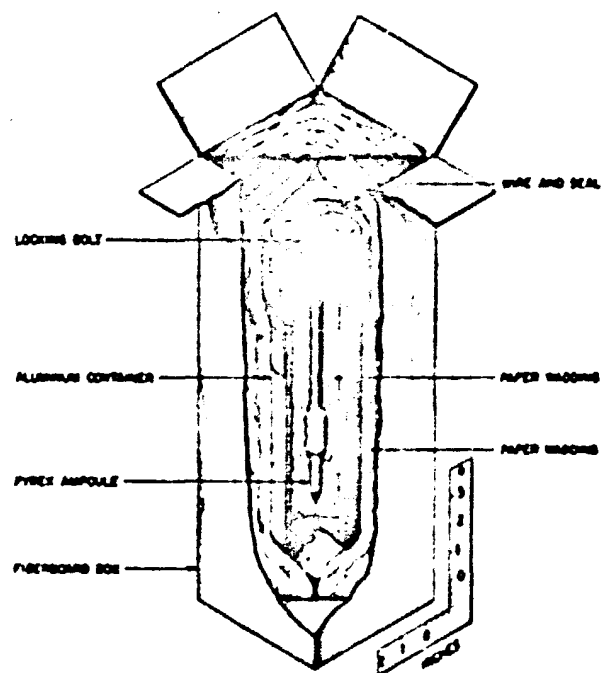


FIGURE 8
RETURNABLE GAS CONTAINER

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FOLD MARKS	TYPE OF CONTAINER	TYPE OF MATERIAL GROUP	NUMBER ACTIVITY		PERCENTAGE OF LEAD BUILT IN	OUTSIDE DIMENSIONS OF BUILT IN	VOLUME OF BUILT IN	OPT. 10 OF BUILT IN
			1	2				
1	Deposits	Deposited lead, iron and steel	7	20 in 1 in 1 in 20 in	20 in 1 in 1 in 20 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14
2	Deposits	Deposited lead and steel	7	20 in 1 in 1 in 20 in	20 in 1 in 1 in 20 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14
3	Deposits	Deposited lead and steel	7	20 in 1 in 1 in 20 in	20 in 1 in 1 in 20 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14
4	Deposits and very small	Deposited lead, iron and steel	5	1 in 1 in 1 in 1 in	1 in 1 in 1 in 1 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14
5	Deposits	Deposited lead and steel	5	1 in 1 in 1 in 1 in	1 in 1 in 1 in 1 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14
6	Deposits	Deposited lead and steel	5	1 in 1 in 1 in 1 in	1 in 1 in 1 in 1 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14
7	Deposits	Deposited lead and steel	5	1 in 1 in 1 in 1 in	1 in 1 in 1 in 1 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14
8	Deposits	Deposited lead and steel	5	1 in 1 in 1 in 1 in	1 in 1 in 1 in 1 in	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14	0.14-0.14-0.14 0.14-0.14