



RETURN 71-5552  
TO D. CRAMEN PDR  
396 S.S.

Department of Energy  
Oak Ridge Operations  
P.O. Box E  
Oak Ridge, Tennessee 37830

July 10, 1981



U.S. Nuclear Regulatory Commission  
ATTN: Mr. Charles E. MacDonald, Chief  
Transportation Certification Branch  
Division of Fuel Cycle & Material Safety  
Washington, D.C. 20553

Gentlemen:

SAFETY ANALYSIS REPORT FOR PACKAGING: THE ORNL GAS-CYLINDER FIRE AND IMPACT SHIELD, REPORT ORNL/ENG/TM-5

Reference is given to the subject SARP and to your Docket No. 71-5552.

In reply to the specific additional information which you requested, ORNL prepared the enclosed supplemental data which has been reviewed by DOE-ORO, and we concur with the conclusions.

We request a priority review.

Sincerely,

*William H. Travis*

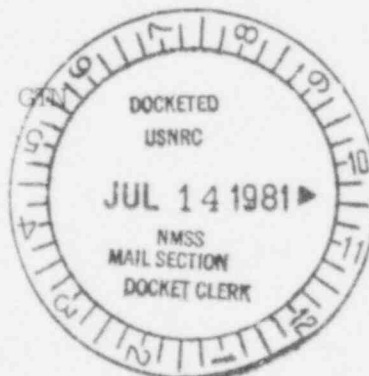
William H. Travis, Director  
Safety & Environmental Control Division

SE-332:WAP  
FSS: 1233

Enclosure:  
ORNL Reply (9)

cc w/encl:  
C. H. Durham, AD-46  
D. M. Ross, EV-133, G-135, GM

cc w/o encl:  
V. J. D'Amico, SE-30



19362

FILE

*DoE request*

19362

B107280076 B10710  
PDR ADOCK 07105552  
C PDR

### Drawings and Specifications

1. Primary containment is provided by gas cylinders as identified on page 4 of the SARP. All existing cylinders were manufactured by Hoke Inc. to comply with DOT Specification 7A. The cylinders are described in Hoke's Sampling Cylinders and Accessories catalog which is attached. Recently Hoke decided to discontinue the manufacture of gas cylinders. To insure future supply, UCC-ND prepared the drawings and data sheets necessary for shop or vendor fabrication. Copies of these documents, drawings X3E-11572-001 thru -007 and data sheets DS-XDE-11572-4 and -5 are attached.
2. The catalog, drawings and data sheets above identify the lead shielding which is integral with the gas cylinders.

### Structural/Containment

1. The flanged and bolted closure employed on the new model shield was used to reduce the possibility of loss of lid in the event of an impact such as the 30-foot free fall. It is noted that this closure is not sealed and does not form part of either primary or secondary containment. To comply with the regulations it is only necessary that lid remain in place to insure that thermal (fire) protection is maintained. The closure bolts, flanges, etc., are fabricated from ductile materials, hence would deform locally near the point of impact if subjected to a free fall. It is acknowledged that failure of the one fastener (closure bolt) directly under the point of impact is possible although not considered probable. This would not significantly reduce fire resistance of the package. The bolted and flanged closure would not change the magnitude of the permanent deformation of container from the model tested at ORGDP and referenced in the SARP.
2. The tests performed at ORGDP demonstrated that the cylinder within the test package did not leak. Hence, it is concluded that the ORNL gas cylinders also would not leak since their construction is similar. With regard to normal conditions of transport these containers have been used since 1968 without any incidence of reduction of containment efficiency due to transporting conditions or environment.

## Shielding

1. As stated above, these packages have been in use since 1968. To date there has been no detectable loss of shielding effectiveness due to normal transport.

The only Type B shipments made in the Gas Cylinder Fire and Impact Shield are uncompressed tritium gas in quantities at 1000 to 30,000 curies. Tritium gas cylinders do not require shielding, therefore there is no loss of shielding effectiveness. Type A quantities of Krypton-85 (100-300 curies) are shipped in the Gas Cylinder Fire and Impact Shield to meet the Type A drop test requirements on the 2 and 5 liter shielded containers. All other Krypton-85 shielded gas cylinders meet the Type A drop test requirements (ORNL TM-5452).

2. The ORGDP tests referenced above indicated no physical damage to the internal of the fire and impact shield as a result of the hypothetical accident. Hence, a detectable reduction of shielding is not expected.

## Leak Testing Gas Cylinders

All ORNL Gas Cylinders are leak tested before loading radioactive gases for shipment. The sensitivity of the leak rate test is  $>1.5 \times 10^{-6}$  atm cm<sup>3</sup>/sec. See attached procedure No. 15.

All ORNL Gas Cylinders which are loaded with uncompressed radioactive gases are tested before shipment. The sensitivity of the leak rate test is  $>1 \times 10^{-7}$  atm cm<sup>3</sup>/sec. See attached procedure No. 16A.

OPERATIONS DIVISION  
RADIOISOTOPE DEPARTMENT  
BUILDING 3033

PAGE 1  
DATE 10/31/78

KRYPTON AND TRITIUM FACILITY  
PROCEDURE FOR HANDLING TRITIUM

LEAK CHECKING SHIPPING CYLINDERS BEFORE LOADING

- |  |  |
|--|--|
| 1. All valves closed, with system evacuated.   | 1. Normal standby condition.   |
| 2. Tighten valve adjustment nut to 190 in.-lbs torque with a torque wrench and record. Place wax seal on valve adjustment nut. | 2. If wax seal is not broken, valve adjustment nut does not need to be retightened. Record "OK" in torque column.          |
| 3. Connect cylinder to loading line.   |  |
| 4. Open valve 2, valve 4, and remove hemostat from loading line.   | 4. Loading line will be evacuated.   |
| 5. Open cylinder valve.  | 5. Slowly open valves in case of pressure in cylinder.   |
| 6. Close valve 2, open valve 1.  | 6. Evacuate cylinder to <10 microns.   |
| 7. Close cylinder valve, close valves 1 and 4, and hemostat loading line.  |  |
| 8. Disconnect cylinder from system.  | 8. <u>DO NOT</u> put blind gland in place.   |
| 9. Set cylinder aside.   | 9. Must have minimum of 4 hr shelf time.   |
| 10. Connect cylinder to system loading line.   |  |
| 11. Open valve 2, valve 4, and hemostat on loading line.   | 11. Loading line will be evacuated.  |
| 12. Close valve 2, open valve 1.   | 12. Continue pumping until pressure is below 10 microns.   |
| 13. Close valve 1.   |  |
| 14. Open cylinder valve.   | 14. Any increase in pressure above that observed in Step 6 denotes a leak of $>1 \times 10^{-6}$ atm cm <sup>3</sup> /sec. |
| 15. Close cylinder valve.  | 15. If no leak, proceed to loading procedure. If leak is detected, disconnect cylinder and set aside for repair.           |

APPROVED:

SUPERVISOR  
*Jack Debra*  
UCN-12530A (3 4-77)

PROCESS GROUP LEADER  
*R. W. [Signature]*

DATE  
10/31/78



# RADIOISOTOPE DEPARTMENT

PAGE 1 OF 1  
DATE 10/11/78

BUILDING 3033

KRYPTON AND TRITIUM FACILITY

## PROCEDURE FOR LEAK TESTING LOADED TRITIUM CYLINDERS FOR SHIPMENT

1. Disconnect cylinder from loading line.
  2. Place blind gland over cylinder valve opening.
  3. Put wire seal through hole in valve handle, through extra 1/4 by 1/4 connector and around valve body.
  4. Using pliers with special seal crimp, squeeze lead on wire seal.
  5. Place wax seal on blind gland and valve adjustment nut.
  6. Place valve cover cap in position.
  7. Decontaminate cylinder for shipment.
  8. Set cylinder aside for a minimum 4 hour shelf time.
  9. Evacuate special ion chamber (Al body).
  10. Remove plug from top of cylinder valve cover cap.
  11. Attach special ion chamber to cap opening.
  12. Open valve on special ion chamber.
  13. Close valve on special ion chamber and detach from cap.
  14. Replace plug in cap.
  15. Remove special ion chamber to electrometer and count.
5. Seal should already be on valve adjustment nut. Check to be sure it is intact. If not, re-torque nut and replace wax seal.
  7. Must be below shipping tolerance of 200 d/m tritium.
  8. Preparation for leak check.
  9. Volume of chamber is equal volume of cylinder valve cover cap.
  12. Pressure in chamber and cap equalizes
  15. A reading  $< 5 \times 10^{-9}$  amp after 16 hours shelf time is acceptable. A higher reading indicates a leak of  $> 1 \times 10^{-7}$  atm-cm<sup>3</sup>/sec.

APPROVED:

SUPERVISOR

*J. R. DeLoe*

PROCESS GROUP LEADER

*R. W. Schaidt*

DATE

10/11/78

OPERATIONS DIVISION  
RADIOISOTOPE DEPARTMENT

PAGE 2 OF 2  
DATE 10/11/78

BUILDING 3033

KRYPTON AND TRITIUM FACILITY

PROCEDURE FOR LEAK TESTING LOADED TRITIUM CYLINDERS FOR SHIPMENT

16. Evacuate special ion chamber.
17. Tritium cylinder may be moved to Packing and Shipping area for loading into Gas Cylinder Fire and Impact Shield. Tritium content of 1000 curies or less do not require Gas Cylinder Fire and Impact Shield.

APPROVED:

SUPERVISOR

*John Decker*

UCN-12530A (3 4-77)

PROCESS GROUP LEADER

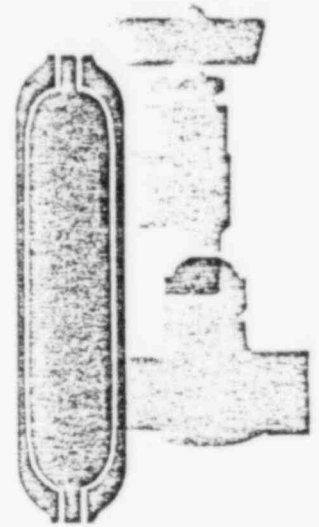
*R.W. Schaidt*

DATE

10/11/78

# SAMPLING CYLINDERS

and accessories



Stocked and Distributed By  
**KNOX VALVE & FITTING CO.**  
 6310 Deane Hill Drive      2516 Arthur Road  
 Knoxville, Tenn.      Germantown, Tenn. 38038  
 (615) 588-7475      (901) 884-3238

SAMPLING CYLINDERS	Page
Low Pressure 400 PSIG .....	2
High Pressure 1800 PSIG .....	3
High Pressure 5000 PSIG .....	3
CYLINDER ACCESSORIES .....	3
CYLINDER VALVES (Packed)	
With Safety Devices .....	4
Without Safety Devices .....	5
SAFETY CYLINDER ADAPTERS	
Spring Relief & Bursting Disc .....	8
CYLINDER VALVES (Diaphragm Sealed)	
Without Safety Devices .....	7
With Bursting Discs & Safety Reliefs .....	8-9
PACKED CYLINDER VALVES .....	9
LECTURE BOTTLE NEEDLE VALVES .....	9
ISOTOPE CONTAINERS .....	10
HOKE CATALOGS .....	11
HOKE DISTRIBUTORS .....	12

HOKE INC., 1 TENAKILL PARK, CRESSKILL, N. J. 07626



# Sampling cylinders



For the safe containment and transportation of pressurized samples of various gases and liquids.

## APPLICATIONS:

- Sampling hydrocarbons in refineries and petrochemical plants
- Gas sampling for chromatographic analysis
- Cesium containment in transportation and field storage
- Snubbers in reactor feed lines
- Surge accumulators in High Pressure Gas Systems
- High Vacuum Systems as experimental chambers and molecular sieves

## MAXIMUM OPERATING PRESSURE:

304SS Cylinderst		
Low Pressure	.....	400 PSIG
High Pressure	.....	1800 PSIG
Monel Cylinders	.....	Refer to specifications chart.

*†10 ml. and 30 ml. cylinders are produced in 316SS.*

## OPERATING TEMPERATURE RANGE:

@ Max. Oper. Pressure ..... -320° to 600°F

## CAPACITIES:

Standard Cylinders: ..... 10 ml. to 5 gal.  
 Custom Cylinders: ..... To 10 Gallons

## SPECIAL MATERIALS: Working Pressures to 10,000 PSI

Limited quantities are available for immediate delivery.

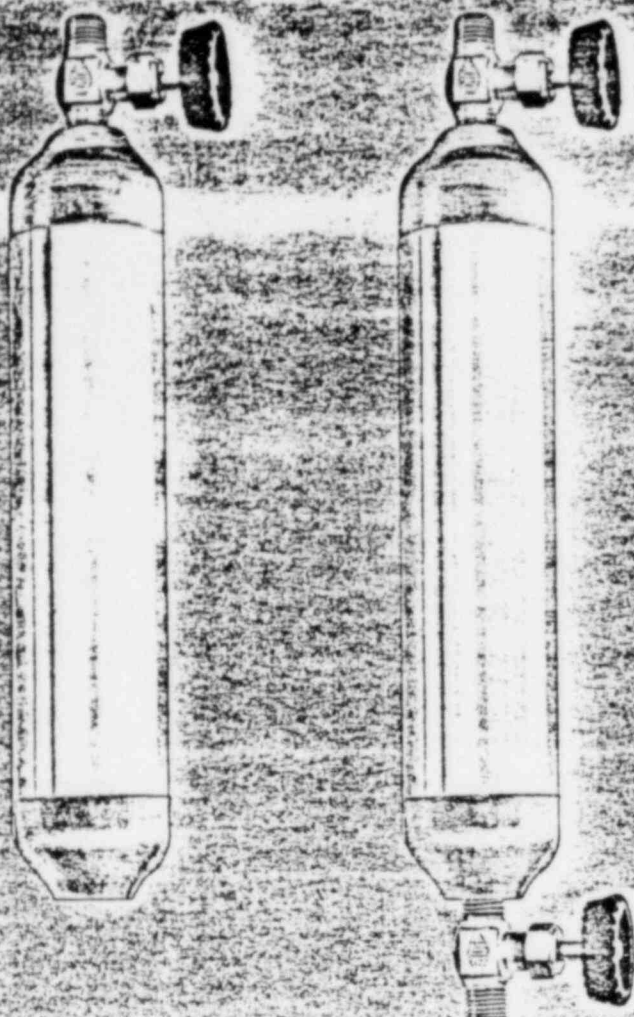
- Aluminum
- 316SS
- 321SS
- Nickel
- Inconel
- Hastelloy

## LOW PRESSURE — STAINLESS STEEL — 400 PSIG

Approx. Capacity	Conn. NPT female A	ORDER BY CYLINDER PART NO.		DOT Rating	(App.) Length B	Out. Diam. (App.) C	Weight (Approx.)
		Single Conn.	Double Conn.				
10 ml.	1/8	2LS10	2LD10	Exempt	4 1/8	3/8	3 oz.
30 ml.	1/8	2LS30	2LD30	Exempt	4 13/16	1	8 oz.
30 ml.	1/4	4LS30	4LD30	Exempt	4 13/16	1	8 oz.
75 ml.	1/4	4LS75	4LD75	Exempt	4 5/8	1 1/2	14 oz.
150 ml.	1/4	4LS150	4LD150	3B400	8 3/4	1 1/2	1 1/2 lbs.
300 ml.	1/4	4LS300	4LD300	3B400	9 1/2	2	2 1/4 lbs.
500 ml.	1/4	4LS500	4LD500	3B400	14 1/4	2	3 1/4 lbs.
1000 ml.	1/2	8LS1000	8LD1000	3B400	10 1/4	3 1/2	4 1/2 lbs.
2250 ml.	1/2	8LS2250	8LD2250	3B400	15 1/2	4	8 lbs.
3000 ml.	1/2	8LS3000	8LD3000	3B400	19 1/2	4	9 3/4 lbs.
1 gal.	1/2	8LS1-G	8LD1-G	3B400	24	4	11 1/2 lbs.
2 1/2 gal.	1/2	8LS2 1/2-G	8LD2 1/2-G	3B400	23	6 5/8	28 lbs.
5 gal.	1/2	8LS5-G	8LD5-G	3B400	32 1/4	8	66 lbs.

NOTE: 3/8 NPT female connections are available for 75, 300, and 500 ml. capacity cylinders. Contact Hoke for delivery information.

Outage tubes are available with or without valved cylinders. To order, specify the outage percentage desired. i.e.: If you are a cylinder filled to 70% of total capacity, a 30% outage should be ordered.



## FEATURES

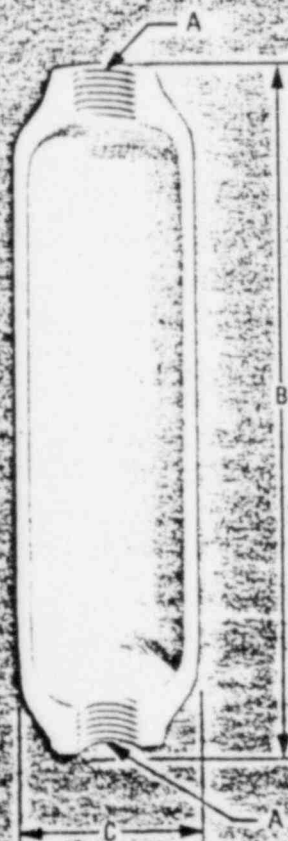
Choice of 14 different capacities from 10 ml. thru 5 gallons

All cylinders conform to Department of Transportation Regulations

Single and double ended cylinders are available in all capacities as standard

Precision spinning operation eliminates internal pockets and provides easy flow of the sample.

Cylinders are die formed from seamless drawn 304SS or Monel tubing. Other materials are available on special order.



# Sampling cylinders



HIGH PRESSURE — STAINLESS STEEL — 1000 PSIG

ORDER BY  
CYLINDER PART NO.

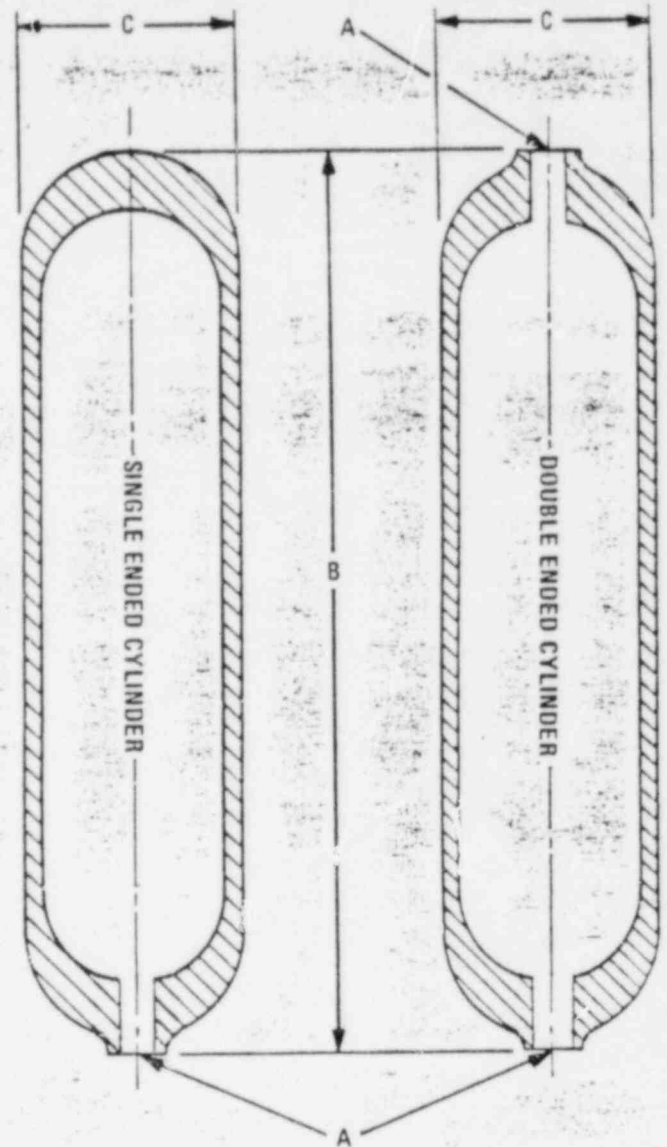
Capacity (Approx.)	Conn. NPT female A	Single Conn.	Double Conn.	DOT Rating	(App.) Length B	Out. Diam. (App.) C	Weight (Approx.)
10 ml.	1/8	2HS10	2HD10	Exempt	4 1/8	3/8	3 oz.
30 ml.	1/8	2HS30	2HD30	Exempt	4 1/8	1	8 oz.
30 ml.	1/4	4HS30	4HD30	Exempt	4 1/8	1	8 oz.
75 ml.	1/4	4HS75	4HD75	Exempt	4 1/8	1 1/2	14 oz.
150 ml.	1/4	4HS150	4HD150	3E1800	8 1/2	1 1/2	1 1/2 lbs.
300 ml.	1/4	4HS300	4HD300	3E1800	9 1/2	2	2 1/2 lbs.
500 ml.	1/4	4HS500	4HD500	3E1800	14 1/4	2	3 1/2 lbs.
1000 ml.	1/4	8HS1000	8HD1000	3A1800	10 1/4	3 1/2	8 lbs.
2250 ml.	1/4	8HS2250	8HD2250	3A1800	16 1/4	4	14 1/2 lbs.
3000 ml.	1/4	8HS3000	8HD3000	3A1800	21	4	17 1/2 lbs.
1 gal.	1/4	8HS1-G	8HD1-G	3A1800	25 1/4	4	21 lbs.
2 1/2 gal.	1/4	8HS2 1/2-G	8HD2 1/2-G	3A1800	24 1/4	6 1/2	49 1/2 lbs.
5 gal.	1/4	8HS5-G	8HD5-G	3A1800	32 1/4	8	89 lbs.

NOTE: Optional 3/8" NPT female connections are available for 75 ml through 500 ml cylinders. Contact Hoke factory for details.

## HIGH PRESSURE — MONEL\*

Approx. Capacity	Conn. NPT female A	ORDER BY CYLINDER PART NO.		Work'g. Press. (PSI)	Approx. Length B	Approx. Outside Diameter C	Approx. Weight
		Single Conn.	Double Conn.				
95 ml.	1/4	4HSM 95	4HDM 95	5000	5 1/2	1 1/2	1 1/2 lbs.
150 ml.	1/4	4HSM 150	4HDM 150	5000	6 1/2	2 1/2	2 1/2 lbs.
300 ml.	1/4	4HSM 300	4HDM 300	5000	11 1/4	4	4 lbs.
500 ml.	1/4	4HSM 500	4HDM 500	5000	19 1/2	7	7 lbs.
1000 ml.	1/4	4HSM1000	4HDM1000	3500	11 1/2	12 1/4	12 1/4 lbs.

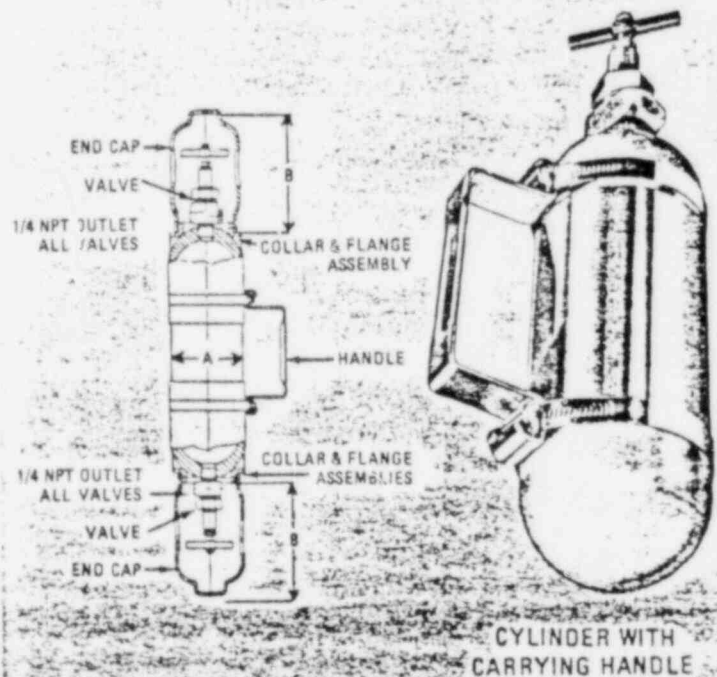
\*These cylinders meet the DOT rating, but since they are made of Monel cannot be pre-registered. Where transportation by common carrier is planned, special permits are obtainable from the Department of Transportation, Washington, D.C.



## CYLINDER ACCESSORIES —

CARRYING HANDLES, VALVE PROTECTION END CAPS

ORDER BY CATALOG PART NO.			Cylinder Number		A Outside diameter	B
Collar & Flange Assy. No.	End Cap Part No.	Carrying Handle Kit Part No.	High Pressure	Low Pressure		
1733	3107	80228-1	6HD300	6LD300	2	6 1/8
1733	3107	80228-1	6HD500	6LD500	2	6 1/8
80226-1	3107	80229-1	8HD1000	8LD1000	3 1/2	6 1/8
80227-1	3107	80230-1	8HD2250	8LD2250	4	6 1/8
80227-1	3107	80230-1	8HD3000	8LD3000	4	6 1/8
80227-1	3107	80230-1	8HD1-G	8LD1-G	4	6 1/8
1733-1	3107	80350-1	—	8LD2 1/2-G	6 1/8	6 1/8
1733-1	3107	80351-1	—	8LD5G	8	6 1/8
1757	3107	80350-1	8HD2 1/2-G	—	6 1/8	6 1/8
1757	3107	80351-1	8HD5G	—	8	6 1/8
1756	3107	80228-1	4HDM150	—	1 1/2	6 1/8
1756	3107	80228-1	4HDM300	—	1 1/2	6 1/8
1756	3107	80228-1	4HDM500	—	1 1/2	6 1/8



CYLINDER WITH CARRYING HANDLE

# Valves with safety devices



A variety of Brass, Stainless steel, and Monel valves, with or without safety devices are available from Hoke. Depending on operating conditions, needle valve series of integral bonnet, union bonnet with metal plug or Teflon plug disc may be selected.

Other available accessories include cylinder carrying handles, valve protection end caps, outage tubes according to specified percentage with cylinder valve assemblies, and "Saf-tee" cylinder adapters.

See page 3 for details.

Basic Material: 316SS

Packing: TFE or Buna-N O-Ring

## UNION BONNET VALVES WITH SAFETY DISCS

BURSTING DISC ORDERING CHART	CODE LETTER	PRESSURE RANGE
	D	1400 - 1600 PSI
	G	1800 - 2000 PSI
	E*	2600 - 3000 PSI
	F	3600 - 4000 PSI
	H	5600 - 6000 PSI

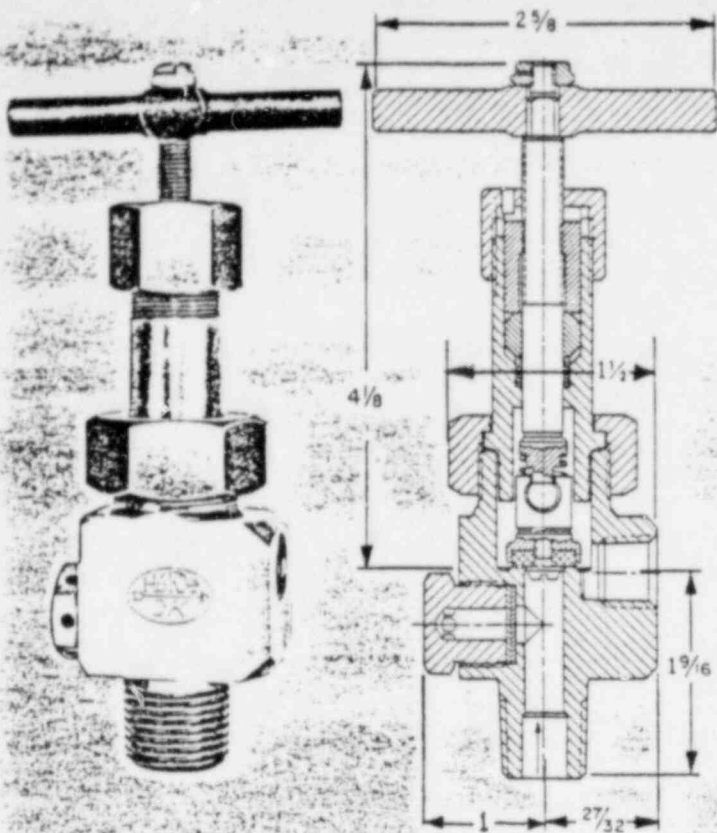
2464L64Y

\*Normally supplied with DOT 3E 1800 and DOT 3A-1800.

### ORDER BY CATALOG PART NUMBER

#### Union Bonnet Valves in 316SS

Inlet NPT Male	Outlet NPT Female	Teflon Packing		O-Ring Packing	
		Teflon Plug Disc	Metal Plug	Teflon Plug Disc	Metal Plug
3/8	1/4	2464 L64Y <input type="checkbox"/>	2424 L64Y <input type="checkbox"/>	2463 L64Y <input type="checkbox"/>	2423 L64Y <input type="checkbox"/>
1/2	1/4	2464 L84Y <input type="checkbox"/>	2424 L84Y <input type="checkbox"/>	2463 L84Y <input type="checkbox"/>	2423 L84Y <input type="checkbox"/>



VALVE NO. 2464L64Y  
SAFETY DISC

## UNION BONNET VALVES WITH SPRING RELIEFS

SPRING RELIEF ORDERING CHART	CODE LETTER	PRESSURE RANGE
	A	150 to 175 PSI
	B	250 to 300 PSI
	C	350 to 400 PSI
	D*	540 to 600 PSI*

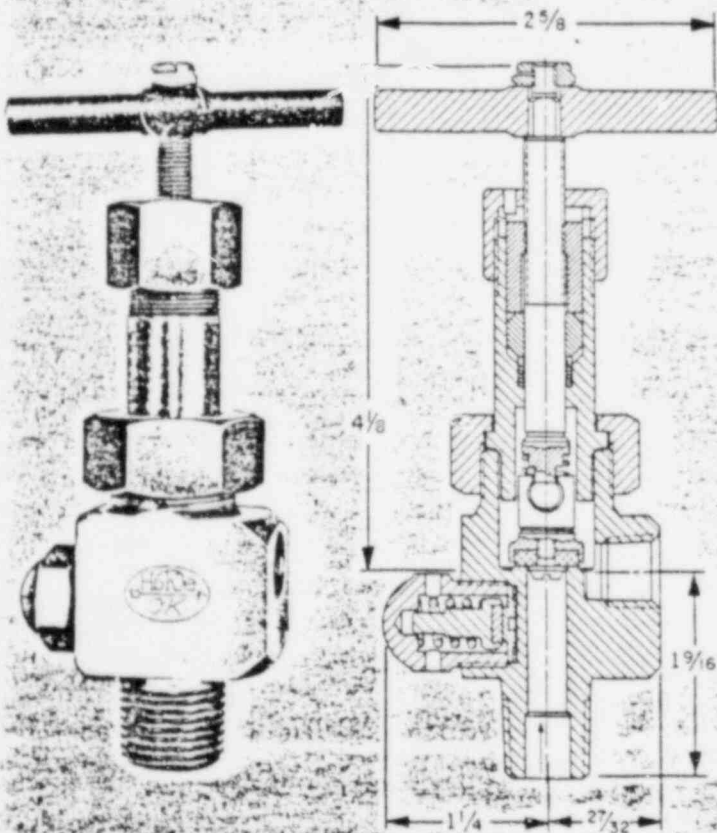
2466L64Y

Normally supplied with DOT-3B-400

### ORDER BY CATALOG PART NUMBER

#### Union Bonnet Valves in 316SS

Inlet NPT Male	Outlet NPT Female	Teflon Packing		O-Ring Packing	
		Teflon Plug Disc	Metal Plug	Teflon Plug Disc	Metal Plug
3/8	1/4	2466 L64Y <input type="checkbox"/>	2426 L64Y <input type="checkbox"/>	2465 L64Y <input type="checkbox"/>	2425 L64Y <input type="checkbox"/>
1/2	1/4	2466 L84Y <input type="checkbox"/>	2426 L84Y <input type="checkbox"/>	2465 L84Y <input type="checkbox"/>	2425 L84Y <input type="checkbox"/>



VALVE NO. 2466L64Y  
SPRING RELIEF

### ORDERING INSTRUCTIONS

- Determine whether the relief range you require is served by a spring relief or a safety disc relief.
- Select the valve part number from the table directly below the desired range.
- Order by part number followed by code of the desired range. For example: No. 2464L64Y

# Valves without safety devices



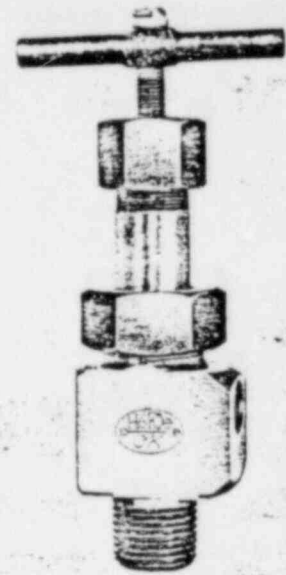
Maximum Operating Pressure @ 70°F	3000PSIG
Proof Pressure @ 70°F	6000PSIG
Burst Pressure @ 70°F	12000PSIG
Operating Temperature Range	-40° to 350°F
Operating Torque @ 3000PSI & 70°F	12-15 in. lbs.

## UNION BONNET VALVES WITHOUT SAFETY DEVICES

Inlet NPT	Outlet NPT	Flow Pattern	ORDER BY CATALOG PART NUMBER			
			Teflon Packing		O-Ring Packing	
			Teflon Plug Disc	Metal Plug	Teflon Plug Disc	Metal Plug
3/8 Male	1/4 Female	Angle	2462 L64Y	2422 L64Y	2461 L64Y	2421 L64Y
1/2 Male	1/4 Female		2462 L84Y	2422 L84Y	2461 L84Y	2421 L84Y

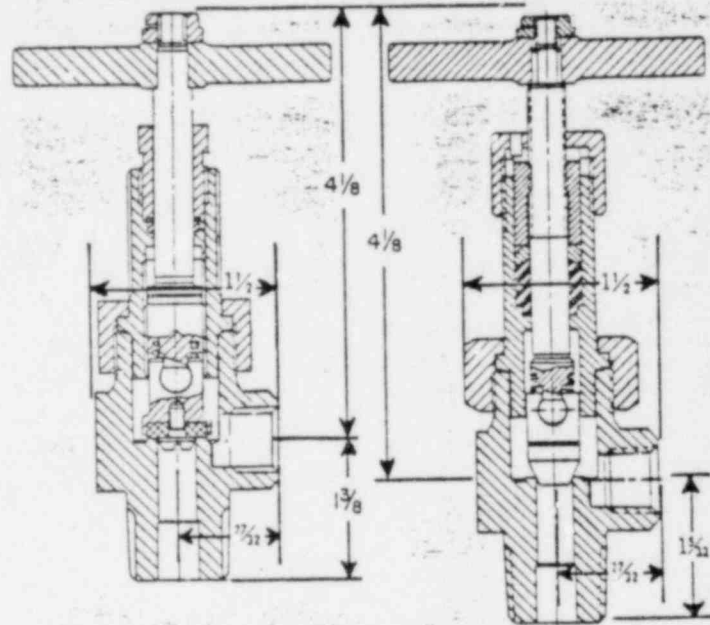
### MATERIALS OF CONSTRUCTION

Body	316SS
Stem	316SS
Packing Nut	303SS
Compression Spring	316SS



VALVE NO. 2461L64Y  
TEFLON PLUG

VALVE NO. 2422L84Y  
METAL PLUG



## NEEDLE VALVES WITHOUT SAFETY DEVICES

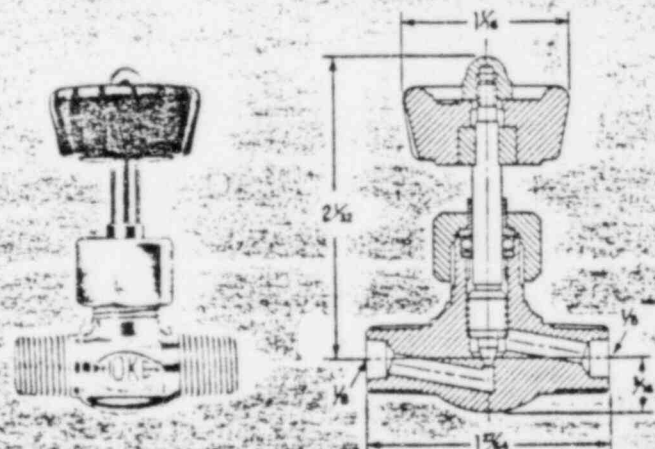
Inlet NPT	Outlet NPT	Flow Pattern	ORDER BY CATALOG PART NUMBER			
			Brass	303SS	316SS	Monel
1/8	1/8	Globe	3112 M2B	3112 M2S	—	—
1/4	1/4		3212 M4B	3212 M4S	3212 M4Y	3212 M4M
3/8	3/8		3312 M6B	—	—	—
1/2	1/4		—	—	2215 L64Y	—
1/4	1/4		—	—	2215 L84Y	—
1/4	1/4	Angle†	3222 M4B	3222 M4S	1222 M4Y	—

\*NOTE: Only angle pattern valves can be used on cylinders with protective end caps.

\*Valve is supplied with 1/4 female outlet connection.

### HOKE VALVES—HOKE CYLINDERS

Hoke Sampling Cylinders can be supplied with a variety of Hoke Valves not listed above . . . contact Hoke for complete details.



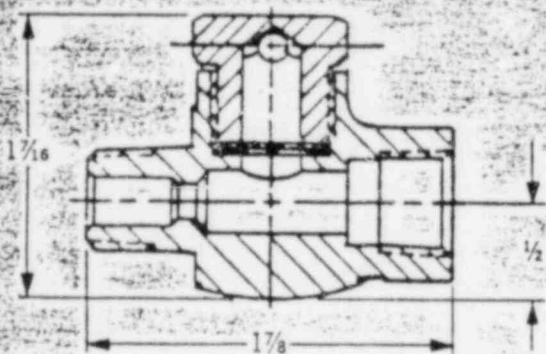
3112 M2B

# Safety valve adapters



Saf-Tee® cylinder adapters may be used with Hoke sampling cylinders as an inexpensive safety device or as a pipe size adapter for connecting valves in the make-up of various cylinder assemblies. Other applications include manifold-to-piping systems and for relieving excessive in-line pressures.

\*Trade Name



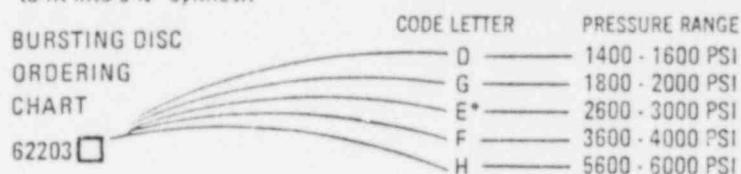
62207 Type - 316SS Forged Style with Bursting Disc.

## BURSTING DISC MODELS

Inlet NPT Male	Outlet NPT Female	ORDER BY CATALOG PART NUMBER	
		303SS Forged Body	316SS Forged Body
1/4	1/4	62203 <input type="checkbox"/>	62207 <input type="checkbox"/>
3/8	1/4	62205 <input type="checkbox"/>	62209 <input type="checkbox"/>
1/2†	1/4	—	† 62211 <input type="checkbox"/>

†A special reducing bushing is packed with the unit to permit the 1/2" adapter to fit into a 3/8" cylinder.

BURSTING DISC  
ORDERING  
CHART

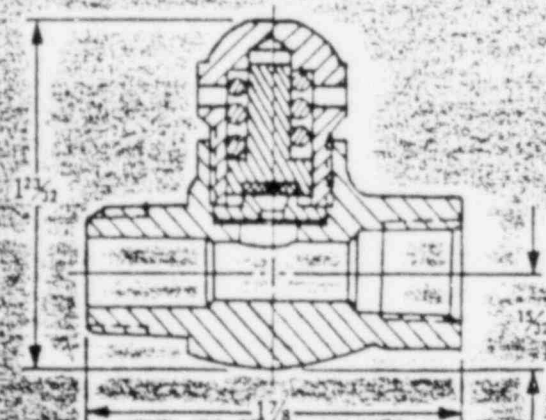
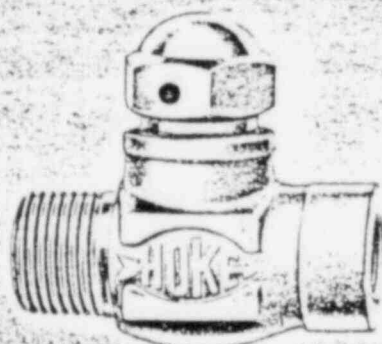


\*Normally supplied with DOT 3E 1800 and DOT 3A-1800.

## MATERIALS OF CONSTRUCTION

PART	303SS MODELS	316SS MODELS
Body	303SS Forging	316 Forging
Gaskets	—	Kel-F
Seat ring, relief valve	—	316SS
Seat, spring relief	—	Kel-F Elastomer
Bursting disc	Copper, Wetted side	Platinum-clad
Weights, approx. (lbs.)	0.25	0.44

Operating Temperature Range: -20° to 200° F



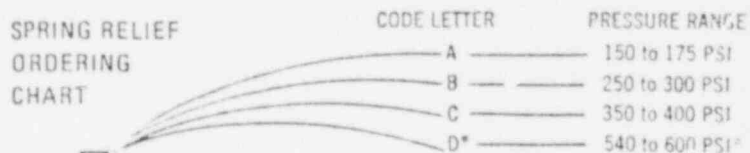
62204 Type - 303SS 380 Forged Body Style with Spring Relief

## SPRING RELIEF MODELS

Inlet NPT Male	Outlet NPT Female	ORDER BY CATALOG PART NUMBER	
		303SS Forged Body	316SS Forged Body
1/4	1/4	62204 <input type="checkbox"/>	62208 <input type="checkbox"/>
3/8	1/4	62206 <input type="checkbox"/>	62210 <input type="checkbox"/>
1/2†	1/4	—	† 62212 <input type="checkbox"/>

†A special reducing bushing is packed with the unit to permit the 1/2" adapter to fit into a 3/8" cylinder.

SPRING RELIEF  
ORDERING  
CHART



\*Normally supplied with DOT-3B-400

## ORDERING INSTRUCTIONS

1. Determine whether the relief range you require is served by a spring relief or a bursting disc relief.
2. Select the adapter part number from the table directly above the desired range.
3. Order by part number, followed by code for the desired range. For Example: No. 62203D

# Cylinder valves



Drawing a gas supply from a storage cylinder is easy with our new line of diaphragm sealed cylinder valves.

Hoke cylinder valves come in a wide variety of models. You can select valves with or without safety devices, 3 different body materials, and two stem joint styles. Connections include 3/8" or 1/2" NPT male inlet with 1/4" NPT female outlet.

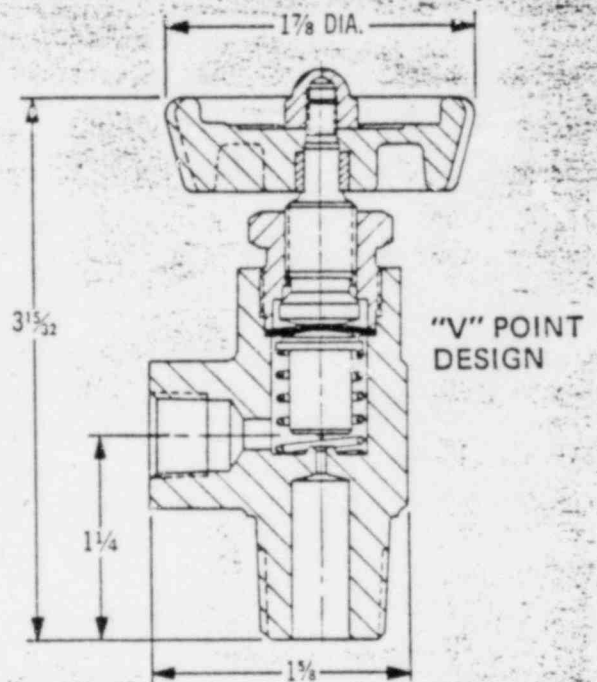
## OPERATING SPECIFICATIONS:

Standard Operating Pressure @ 70°F	2200 PSIG
Proof Pressure @ 70°F	4400 PSIG
Burst Pressure @ 70°F	8800 PSIG
Operating Torque @ 70°F & 100 PSI	3 in. lbs.
Average Seating Torque @ 220° PSI	36 in. lbs.*
Average Operating Torque @ 2200 PSI	16 in. lbs.

\*29" lbs. for seat seated models



MATERIALS OF CONSTRUCTION			
PART	BRASS	316SS	MONEL
Body	Brass	316SS	Monel
Handle	Nylon	Nylon	Nylon
Housing	Brass	Brass	Brass
Spindle	Bronze	Bronze	Bronze
Spring	316SS	316SS	Monel
Plug	Brass	316SS	Monel
Seat	Nylon	—	—
Diaphragm	Copper & 302SS	Copper & 302SS	Copper Monel 302SS

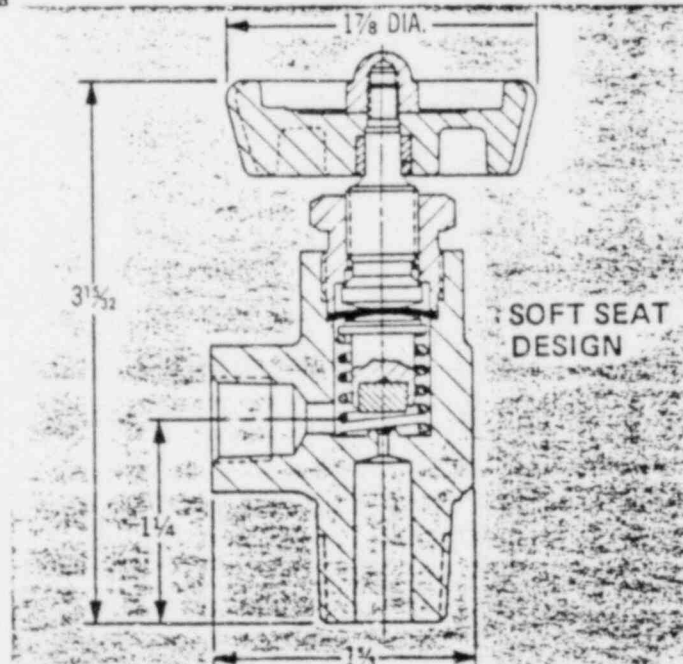


## MODELS WITH METAL "V" POINT DESIGN

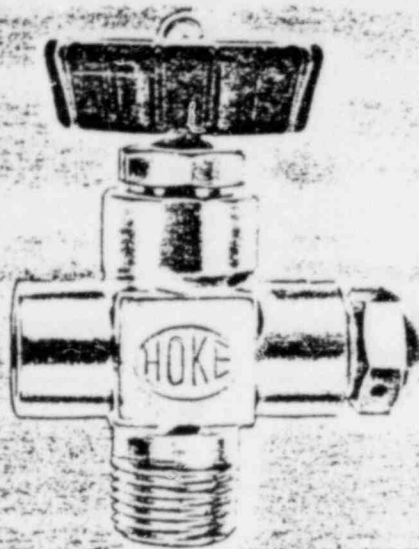
Inlet NPT Male	Outlet NPT Female	Flow Pattern	ORDER BY CATALOG PART NUMBER		
			Brass	316SS	Monel
3/8	1/4	Angle	4810L64B	4810L64Y	4810L64M
1/2	1/4	Angle	4810L84B	4810L84Y	4810L84M

## MODELS WITH SOFT SEAT DESIGN

Inlet NPT Male	Outlet NPT Female	Flow Pattern	ORDER BY CATALOG PART NUMBER
			Brass
3/8	1/4	Angle	4840L64B
1/2	1/4	Angle	4840L84B



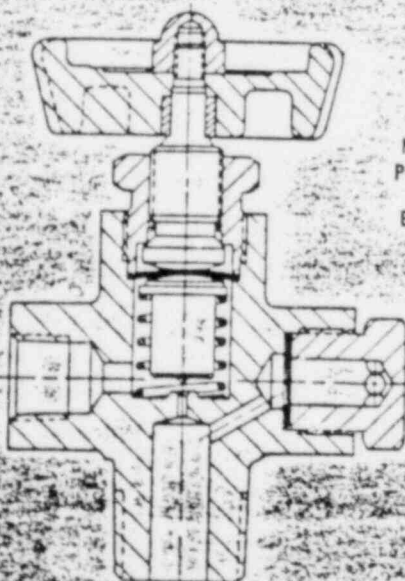
# Diaphragm-sealed valves with spring reliefs



SPRING RELIEF MODEL



BURSTING DISC MODEL



METAL "V" POINT TYPE WITH BURSTING DISC

## OPERATING SPECIFICATIONS

Maximum Operating Pressure @ 70°F . . . . .	600 PSIG
Valve Proof Pressure @ 70°F . . . . .	4400 PSIG
Valve Burst Pressure @ 70°F . . . . .	8800 PSIG
Operating Torque @ 70°F & 100 PSI . . . . .	3 In. lbs.

## MODELS WITH METAL "V" POINT DESIGN

Inlet NPT Male	Outlet NPT Female	Flow Pattern	ORDER BY CATALOG PART NUMBER		
			Brass	316SS	Monel
3/8	1/4	Angle	483□L64B*	483□L64Y	483□L64M
1/2	1/4	Angle	483□L84B*	483□L84Y	483□L84M

\*To order with Nylon seat change the third digit 3 to 6. Example: 483□L64B to 486□L64B.

SPRING RELIEF ORDERING CHART

	Digit Code	Pressure Relief Range (PSI)
483□L64B	1	150-175
	2	250-300
	3	350-400
	4	540-600

## ORDERING INSTRUCTIONS

To order a valve with a spring relief, add the digit code number of the pressure range desired to the valve part number. 4833L64B.

# Diaphragm-sealed valves with bursting discs

## OPERATING SPECIFICATIONS:

Pressure Relief Range . . . . .	2600 - 3000 PSIG
Standard Operating Pressure @ 70°F . . . . .	2200 PSIG
Proof Pressure @ 70°F . . . . .	4400 PSIG
Burst Pressure @ 70°F . . . . .	8800 PSIG
Operating Torque @ 70°F & 100 PSI . . . . .	3 In. lbs.
Average Seating Torque @ 2200 PSI . . . . .	36 In. lbs.*
Average Operating Torque @ 2200 PSI . . . . .	16 In. lbs.

\*20" lbs. for soft seated models

## MODELS WITH METAL "V" POINT DESIGN

Inlet NPT Male	Outlet NPT Female	Flow Pattern	ORDER BY CATALOG PART NUMBER		
			Brass	316SS	Monel
3/8	1/4	Angle	4827L64B*	4827L64Y	4827L64M
1/2	1/4	Angle	4827L84B*	4827L84Y	4827L84M

\*To order with Nylon seat change third digit 2 to 5. Example: 4827L4B to 4857L4B.

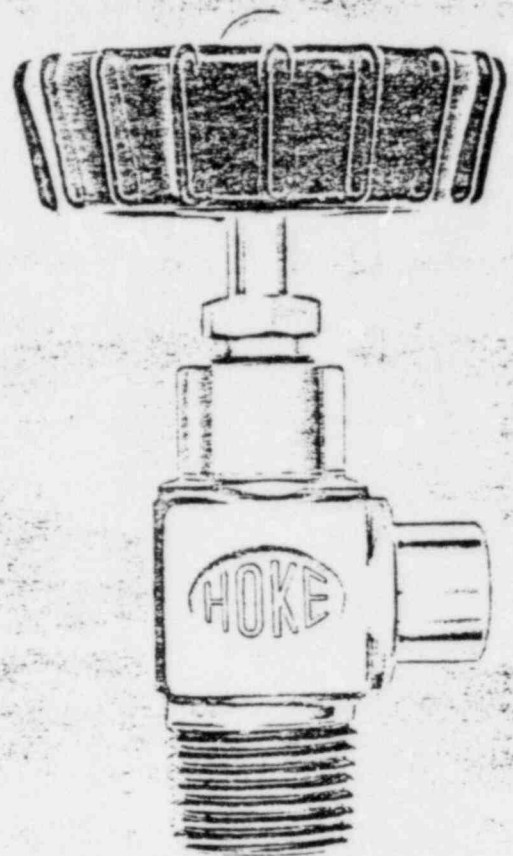
# Packed cylinder valves



- Vee point metal stem
- Dyna-pak wafer stem packing
- Angle flow pattern

CONNECTIONS		ORDER BY MODEL NUMBER		
Inlet	Outlet	Brass	316SS	Monel
1/4 NPT Male	*Lecture Bottle	3642M6SF5B	3642M6SF5Y	3642M6SF5M
1/2 NPT Male	*Lecture Bottle	3642M8SF5B	3642M8SF5Y	364M8SF5M
3/4 NPT Male	1/4 NPT Female	3642L64B	3642L64Y	3642L64M
1/2 NPT Male	1/4 NPT Female	3642L84B	3642L84Y	3642L84M

\*NOTE: Lecture Bottle connections have 5/8-18 External Male Threads and 5/16-32 Internal Female Threads.



3642L84B

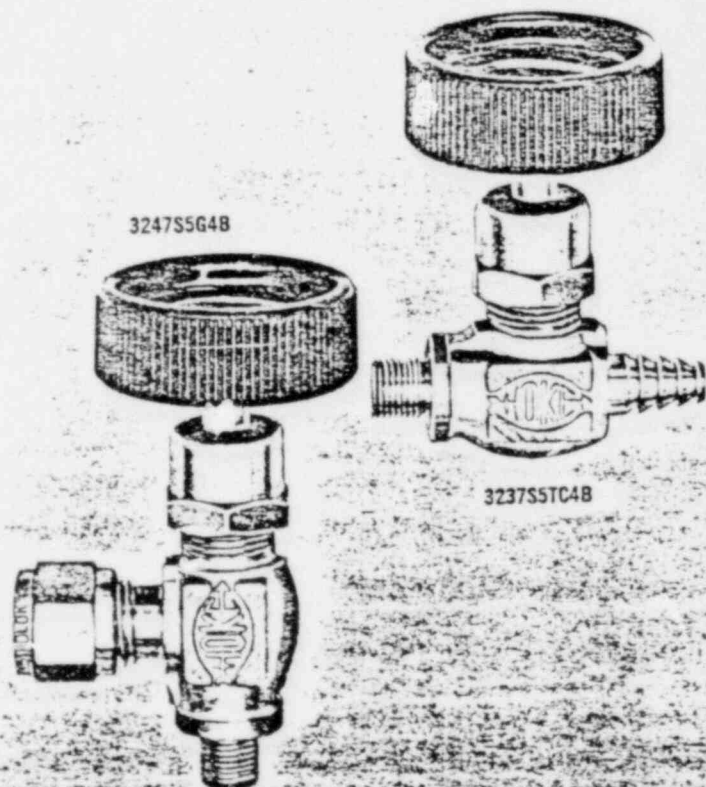
## Lecture bottle Auxiliary needle valves

In addition to manufacturing a variety of packed and packless cylinder valves, Hoke also produces lecture bottle valves for fine metering control of gases.

The valves screw directly into the cylinder and come complete with a gasket seal.

Choose from globe (straight) or angle pattern designs in brass, 316 stainless steel, or Monel.

Flow Pattern	CONNECTIONS		ORDER BY MODEL NUMBER		
	Inlet	Outlet	Brass	316SS	Monel
Globe	5/16-32 Lecture Bottle	1/4" Gyrolok	3237S5G4B	3237S5G4Y	3237S5G4M
Angle	5/16-32 Lecture Bottle	1/4" Gyrolok	3247S5G4B	3247S5G4Y	3247S5G4M
Globe	5/16-32 Lecture Bottle	1/4" Hose Bib	3237S5TC4B	3237S5TC4Y	3237S5TC4M
Angle	5/16-32 Lecture Bottle	1/4" Hose Bib	3247S5TC4B	3247S5TC4Y	3247S5TC4M



3247S5G4B

3237S5TC4B



# Isotope containers



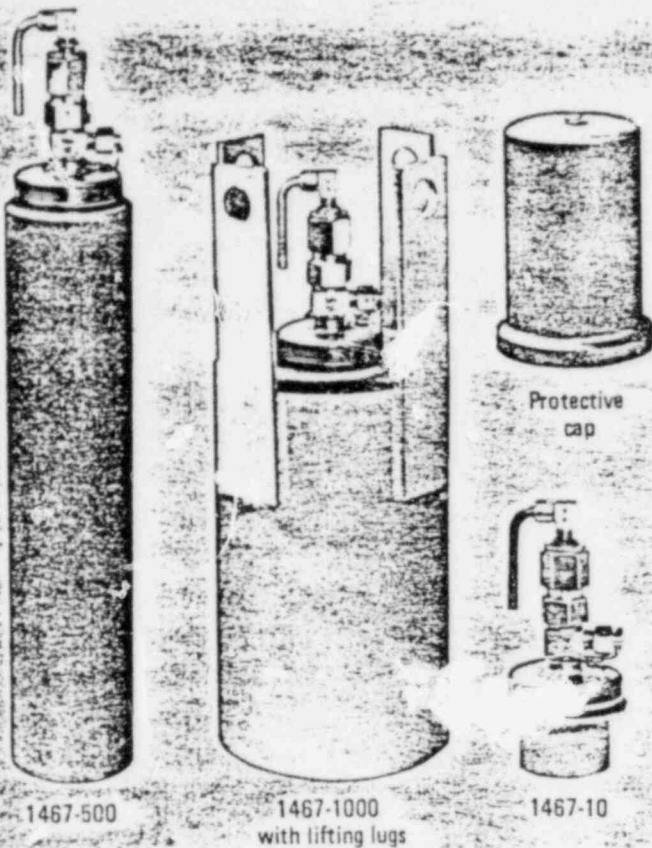
Hoke Radioactive isotope containers were developed in conjunction with the Oak Ridge National Laboratory to provide for the safe containment of gaseous radioactive isotopes. Adequate radiation shielding and valving safeguard the shipment and usage of the contained isotope.

Produced in volume capacities from 10 to 16,000 milliliters these containers essentially consist of an inner stainless steel cylinder jacketed within a larger stainless steel case. The intervening space may be void or lead filled depending upon the isotope involved. The larger capacity containers are provided with external lifting lugs to permit safe handling of the container with mechanized lifting equipment.

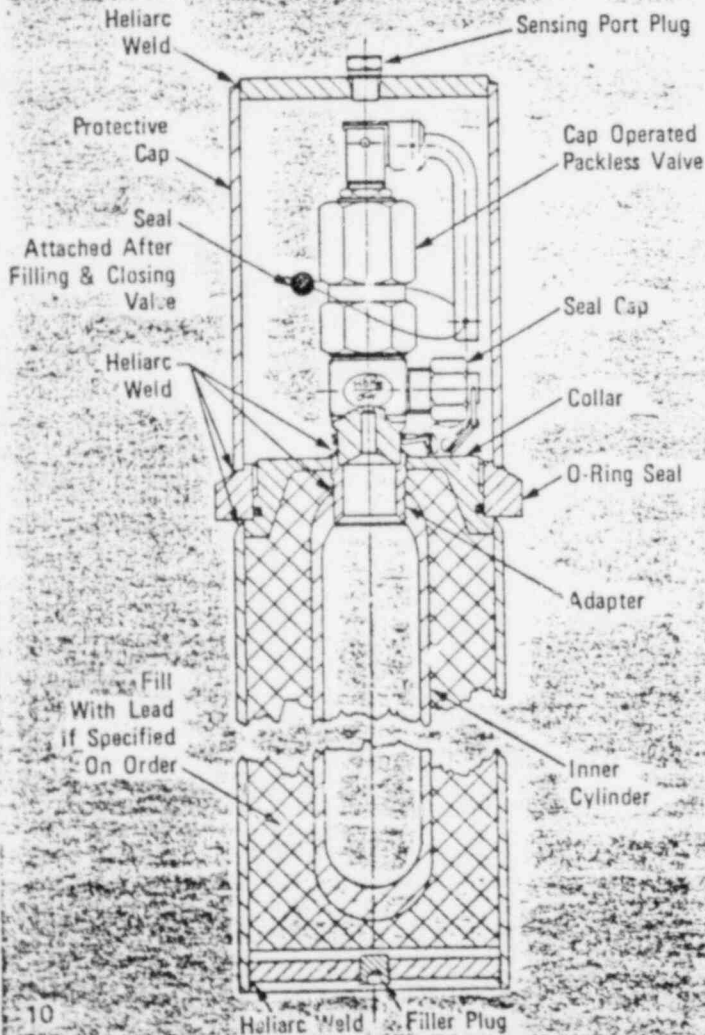
The inner cylinder is valved with a special bellows sealed valve, Hoke No. 4242X2 which was especially designed for this use. All welded construction is used throughout the container. The protective cap which envelops the valve protects it from damage in transit and also provides a sealed cavity in which radioactive material would be trapped in case of accidental valve leakage. A pipe plug on top of the protective cap and on the bottom of the container provides a sensing port for probing.

Each container is supplied with a connecting nut and socket tube fitting assembly designed for brazing to 1/4" O.D. copper tubing. This permits the customer to make up the mating connection.

These containers are designed and manufactured to meet DOT 7A Type A transportation requirements. Each container is serialized and must be marked with the registered symbol of the owner. Where a symbol has not been assigned to a user, Hoke will arrange for the selection and registry of an appropriate symbol.



TYPICAL ISOTOPE CONTAINER



ORDER BY CATALOG NUMBER				
Number Without Lead Filling	Number With Lead Filling	Approx. Capacity (Milliliters)	Length (Approx.)	Outside Diameter
1467-10	L1467-10	10	7 $\frac{5}{16}$ "	3 $\frac{1}{2}$ "
1467-50	L1467-50	50	12 $\frac{5}{16}$ "	3 $\frac{1}{2}$ "
1467-150	L1467-150	150	15 $\frac{13}{16}$ "	3 $\frac{1}{2}$ "
1467-300	L1467-300	300	16 $\frac{11}{16}$ "	3 $\frac{1}{2}$ "
1467-500	L1467-500	500	21 $\frac{1}{8}$ "	3 $\frac{1}{2}$ "
1467-1000†	L1467-1000	1000	16 $\frac{3}{8}$ "	6 $\frac{5}{8}$ "
1467-2000†	L1467-2000	2000	23 $\frac{1}{2}$ "	6 $\frac{5}{8}$ "
1467-3000†	L1467-3000	3000	24 $\frac{1}{2}$ "	8"
1467-5000†	L1467-5000	5000	28 $\frac{1}{8}$ "	8"
1467-16000†	L1467-16000	16000	29 $\frac{3}{8}$ "	10 $\frac{3}{4}$ "

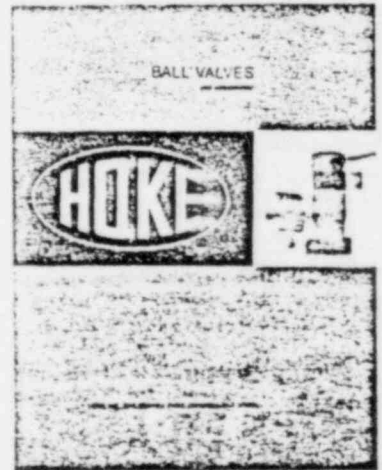
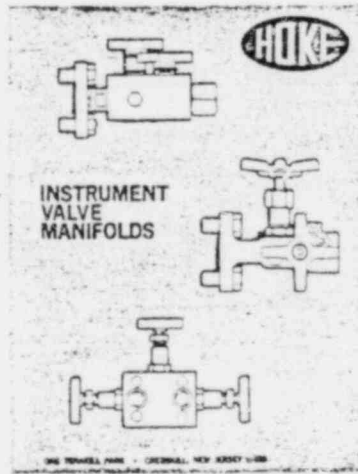
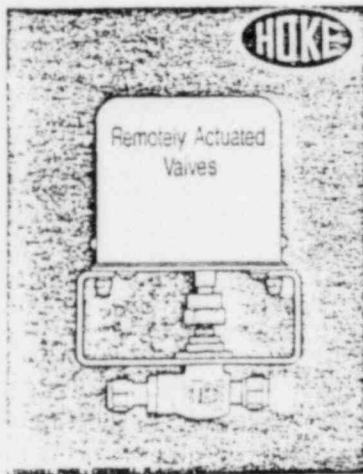
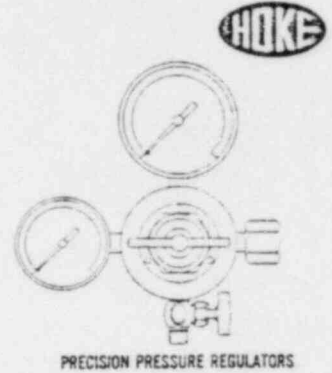
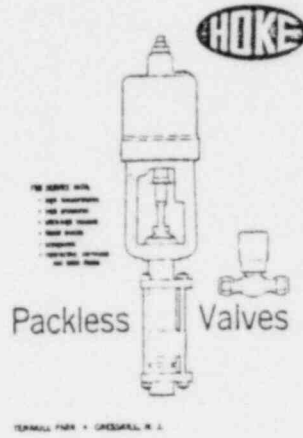
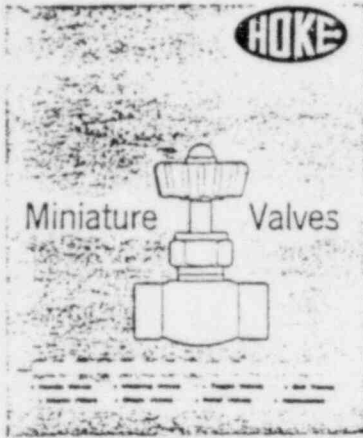
† These containers come with Lifting Lugs. The 16,000 milliliters capacity model is available on special order only.

# HOKE CATALOGS

In addition to manufacturing Sampling Cylinders, Hoke also produces a complete line of fluid control components.

Catalogs on each of these products may be obtained by contacting your local distributor or by writing to us directly.

A list of distributors is shown on the opposite side of this page.





## ALABAMA

Birmingham  
(See Georgia)  
Mobile  
(See Louisiana)

## ARKANSAS

Little Rock Area  
(See Memphis, Tenn.)  
Ft. Smith Area  
(See Tulsa, Okla.)  
Pine Bluff Area  
(See Baton Rouge, La.)

## CALIFORNIA

Los Angeles  
CASTLE CONTROLS CO., INC.  
2823 E. Foothill Blvd.  
Pasadena 91107  
(213) 684-2423  
Oakland  
CON-VAL INCORPORATED  
412 Pendleton Way  
(415) 568-8922

## COLORADO

Denver Area  
JAMES B. DRUMMOND CO.  
3021 South Broadway  
Englewood 80110  
(303) 789-2281

## CONNECTICUT

Bloomfield 06002  
JOSEPH H. BERTRAM & CO., INC.  
4 Britton Drive  
(203) 243-0321

## DELAWARE

(See Philadelphia, Pa.)

## FLORIDA

Orlando 32806  
MILNE ASSOCIATES  
1505 Belmont Drive  
(305) 424-4087

## GEORGIA

Chamblee 30341  
PROCESS SUPPLIES &  
ACCESSORIES  
P. O. Box 80625  
(404) 458-4456

## ILLINOIS

Chicago  
ENPRO, INCORPORATED  
72 N. Michigan Avenue  
Villa Park 60181  
(312) 279-2525

## INDIANA

ENPRO, INCORPORATED  
744 N. Michigan Avenue  
Villa Park, Illinois 60181  
(312) 279-2525

## IOWA

(See Chicago)

## KANSAS

Lawrence 66044  
KANSAS CITY CONTROLS  
P. O. Box 751  
(913) 842-6111

## KENTUCKY

(See Cincinnati, Ohio)

## LOUISIANA

Baton Rouge 70815  
ALFORD-WOODS-CHILDS ENG. CO.  
11440 Darryl Drive  
(504) 926-5595

## MARYLAND

Baltimore 21223  
BRIGGS-COOPER, INC.  
2916 Stafford Street  
(301) 945-2200  
Cumberland  
(See Pittsburgh, Pa.)

## MASSACHUSETTS

Boston  
JOSEPH H. BERTRAM & CO., INC.  
(617) 444-7304

## MICHIGAN

Detroit 48224  
MICHIGAN VALVE & FITTING CO.  
17236 E. Warren Avenue  
(313) 884-9415

## MINNESOTA

Minneapolis 55343  
GUY SPEAKER CO., INC.  
1017 Excelsior Ave., East  
(612) 935-0135

## MISSOURI

Kansas City  
(See Lawrence, Kansas)  
St. Louis 63110  
RANDON COMPANY  
1058 So. Vandeventer Ave.  
(314) 652-5950

## NEW JERSEY

Clifton 07011  
CROWN CONTROLS, INC.  
388 Getty Avenue  
(201) 478-5757  
(212) 524-7193  
Camden  
(See Philadelphia, Pa.)

## NEW YORK

Albany  
JOSEPH H. BERTRAM & CO., INC.  
(518) 436-4100  
Buffalo 14221  
VA-RE CO INC.  
P.O. Box 247  
(716) 633-5755  
N. Y. C. - Long Island  
(See Clifton, N. J.)  
Westchester County  
JOSEPH H. BERTRAM & CO., INC.  
(203) 243-0321

## NORTH CAROLINA

Matthews 28105  
FLUID FLOW PRODUCTS, INC.  
P. O. Box 1394  
(704) 847-4466

## OHIO

Cincinnati 45239  
J. R. DOUGLASS COMPANY  
1735 De Armand Ave.  
N. College Hill  
(513) 931-4986  
Cleveland 44112  
OHIO VALVE & CONTROL, INC.  
1994 Noble Rd.  
(216) 451-7535

## OKLAHOMA

Tulsa 74127  
THE ERNIE GRAVES CO., INC.  
201 South Houston Street  
(918) 584-4708

## OREGON

Beaverton 97005  
NEW POWER & CONTROLS, INC.  
511 West Chester Pike  
(503) 644-3126

## PENNSYLVANIA

Philadelphia Area  
SHELBY JONES COMPANY, INC.  
511 West Chester Pike  
Havertown 19083  
(215) 446-6600  
Pittsburgh 15234  
FOGELMAN COMPANY, INC.  
3849 Willow Avenue  
(412) 531-4005

## PUERTO RICO

Ponce  
ISLAND SUPPLY CO. INC.  
P. O. Box 1066  
(809) 842-1341

## TENNESSEE

Knoxville 37919  
KNOX VALVE & FITTING CO.  
6310 Deane Hill Drive  
(615) 588-7475  
Memphis 38107  
CENTRAL CONTROLS, INC.  
737 Jackson Avenue  
(901) 525-2223

## TEXAS

Beaumont 77704  
TECH CONTROLS INC.  
Box 2882  
(713) 832-0345  
Dallas 75220  
WHITSON ENGINEERING CO.  
2653 Brenner Drive  
(214) 358-1493  
Houston Area  
TECH CONTROLS INC.  
P. O. Box 6151  
Pasadena 77502  
(713) 473-8111  
Odessa 79760  
WHITSON ENGINEERING CO.  
207 N. Amburgey  
(915) 337-7331

## VIRGINIA

Roanoke  
(See Charleston, W. Va.)  
Richmond  
BRIGGS COOPER, INC.  
4803 Midlothian Pike  
(703) 233-4346

## WASHINGTON

Seattle 98125  
NEW POWER & CONTROLS, INC.  
11300 25th Ave., N. E.  
(206) 362-2321  
Spokane 99202  
NEW POWER & CONTROLS, INC.  
(509) 535-1085

## WEST VIRGINIA

S. Charleston 25303  
FOGELMAN COMPANY, INC.  
401-4th Avenue  
(304) 744-5324

## WISCONSIN

Milwaukee 53208  
GUY SPEAKER COMPANY, INC.  
1425 N. Douglas Street  
(414) 258-2325  
Appleton 54911  
GUY SPEAKER COMPANY, INC.  
1425 N. Douglas Street  
(414) 739-6066

## WYOMING

(See Denver, Col.)

## CANADA

Kitchener, Ontario  
HOKE CONTROLS, LTD.  
280 Manitou Drive  
(519) 578-5710

Montreal, Quebec  
KIRK EQUIPMENT, LTD.  
375 Victoria Avenue  
(514) 481-7795

Edmonton, Alberta  
GLENOR AGENTS & SUPPLIERS LTD.  
10356 58th Avenue  
(403) 434-6491

Dartmouth, Nova Scotia  
ASSOCIATED INSTRUMENTS LTD.  
P. O. Box 248  
(902) 463-5766

Thunder Bay, Ontario  
GEORGE O. HILL SUPPLY LTD.  
P. O. Box 412  
(807) 622-0613

Saskatoon, Saskatchewan  
BELMAC SUPPLY CO., LTD.  
P. O. Box 1568  
(306) 244-0161

Vancouver, British Columbia  
DONALDSON PYRCH & HUME LTD.  
16 E. Hastings Street  
(604) 685-6158

## EXPORT

### HOKE INTERNATIONAL

1 Tenakill Park  
Cresskill, N. J. 07626, U.S.A.  
32 Brookhill Road  
New Barnet, England  
8 Rue Polonceau  
Paris, France  
Other distributors in  
principal cities.

Eric Wischhusen  
KNOX VALVE & FITTING COMPANY  
6310 Deane Hill Drive  
Knoxville, Tennessee 37919  
Phone 588-7475



UNION CARBIDE CORPORATION  
 NUCLEAR DIVISION  
 OAK RIDGE, TENNESSEE 37830

# DATA SHEET

PROJECT  
 RADIOACTIVE GAS SHIPPING  
 CONTAINERS

DATA SHEET NO.  
 DS-XDE-11572-5  
 PAGE OF

REV.

REVISIONS		
REV.	APPROVAL	DATE

PLANT	BUILDING	PREPARED BY	THIS SHEET PART OF
X-10	1000	M. J. Rennich	
W.D. OR E.S.O.		APPROVAL	DATE
		<i>[Signature]</i>	
REQUISITION NO.		PROCURED BY	INSTALLED BY

## Inspection and Leak Testing

All inspections shall be made in accordance with Section V of the ASME Boiler and Pressure Vessel Code.

Visual Inspection (Article 9) - All welds shall be visually inspected.

Liquid Penetrant Examination (Article 6) - Welds which require liquid penetrant examinations are designated on the drawing.

Radiographic Examination (Article 2) - Welds which require radiographic examinations are designated on the drawing.

Leak Testing (Article 10) - Each gas cylinder is to be hydrostatically pressure tested at 600 psi. All welds on the gas cylinders are to be soap bubble tested at 60 psi. All cylinders are to be helium leak tested to a total allowable integrated leak rate of  $1 \times 10^{-6}$  std cm<sup>3</sup>/sec.

All tests are to be made on the gas cylinders before the shielding cylinder has been installed. All soap bubble and/or He leaks (in excess of the limit) are to be repaired and the cylinders completely retested.

Written reports are to be made on all inspections and tests. The reports are to be supplied to UCC-ND with the completed containers.

\*Information to be supplied by equipment manufacturer.



UNION CARBIDE CORPORATION  
 NUCLEAR DIVISION  
 OAK RIDGE, TENNESSEE 37830

# DATA SHEET

PROJECT  
 RADIOACTIVE GAS SHIPPING  
 CONTAINERS

DATA SHEET NO.  
 DS-XDE-11572-4  
 PAGE OF

REV.

REVISIONS		
REV.	APPROVAL	DATE

PLANT X-10	BUILDING 1000	PREPARED BY M. J. Rennich	THIS SHEET PART OF
W.O. OR E.S.O.		APPROVAL <i>[Signature]</i>	DATE
REQUISITION NO.		PROCURED BY	INSTALLED BY

## Welding

All welding shall be performed according to the provisions of a qualified procedure and in accordance with the welding symbols in the fabrication drawings. The fabricator shall qualify all welding procedures used in accordance with Section IX of the ASME Boiler and Pressure Vessel Code. Weld symbols are per AWS A2.4-76.

Performance qualification of welders and welding operators shall conform to Section IX of the ASME Code.

All welds are to be inspected in accordance with data sheet DS-XDE-11572-5.