

## Product Information

### Kilo-Lab® Cylinder Packaging System and Transfer Procedure

Technical Bulletin AL-235

## TECHNICAL BULLETIN

### Product Description

The Kilo-Lab® cylinder packaging system (see Figure 1) and transfer procedure provides a safe and convenient method for storing and dispensing laboratory and development scale quantities of high-hazard and air-sensitive liquids. It provides for minimal exposure of product to personnel and for no exposure of product to air.

A cylinder deposit is required upon purchase of product. The deposit amount will be refunded if the cylinder is returned, empty and in good condition within six months. Each cylinder is stamped with a unique serial number and a detailed history is maintained for each one. The serial number will identify the source of the returned cylinder and initiate the deposit refund. Prior approval for the return of empty cylinders is not necessary.

**Figure 1.**  
Kilo-Lab Cylinders



### Precautions and Disclaimer

Please consult the Material Safety Data Sheet (MSDS) for information regarding hazards and safe handling practices for the product packaged in the Kilo-Lab cylinder. Users must be aware of the hazardous nature of the product and the MSDS must be read and understood.

All users must be fully qualified and experienced laboratory workers, and appropriate personal protective equipment must be worn throughout the entire procedure. Do not work alone.

Read all the steps in this bulletin carefully and completely, including those for clean up, before starting any actual laboratory/production work.

Technical experts are available by telephone to answer questions regarding the proper handling of products in Kilo-Lab cylinders. Contact Sigma-Aldrich at 800-231-8327 for assistance.

### Components

Aldrich will select the cylinder and outlet valve appropriate for its contents (See Table 1 for Kilo-Lab cylinder specifications). Kilo-Lab cylinders come equipped with either a CGA 510 or a CGA 350 outlet valve (see Figures 2 and 3).

The CGA 510 valve (Catalog Number Z148865) is brass with female threads and the CGA 350 valve is stainless steel with male threads (Catalog Number Z251208).

**Figure 2.**  
CGA 510 Outlet Valve and Plug (Legend A)



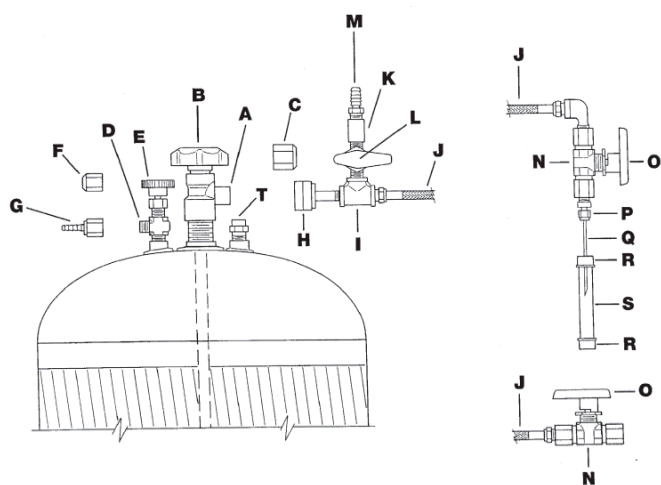
**Figure 3.**  
CGA 350 Outlet Valve and Cap (Legend A)



**Table 1.**  
Specifications of Kilo-Lab Cylinders

	Carbon steel				Stainless Steel
	8 Liter		18 Liter		18 Liter
Material of construction	Carbon steel		Carbon steel		316 Stainless Steel
DOT specification	4BW240		4BA240		E11394-225
Maximum pressure (psig)	240		240		225
Cylinder test pressure (psig)	480		480		450
Shipping pressure, approximate (psig)	5		5		5
Suggested maximum use pressure (psig)	50		50		50
Relief valve set point (psig)	200		200		150
Tare weight, with valves, approximate (kg)	8		10		10
Total capacity (L)	12		21		21
Working capacity (L)	10		18		18
Shipping cube (in.)	9 × 9 × 19		12 × 12 × 19		12 × 12 × 19
Diameter of top collar (in.)	5 7/8		5 7/8		7 1/4
Diameter of bottom foot ring (in.)	8		8		8
Diameter of container body (in.)	8 7/8		12		12
Recommended operating temperature	ambient		ambient		ambient
Maximum operating temperature (°C)	150		150		150
Dip tube I.D. (in.)	1/4		1/4		1/4
Dip tube length (in.)	13 1/2		13 1/2		13 1/2
Valve Fittings	Brass	Stainless Steel	Brass	Stainless Steel	Stainless Steel
Liquid outlet valve	CGA 510	CGA 350	CGA 510	CGA 350	CGA 350
Nitrogen inlet valve	1/4 in. NPT	1/4 in. NPT	1/4 in. NPT	1/4 in. NPT	1/4 in. NPT

**Figure 4.**  
Cylinder schematic and legend



**Legend**

- A: Outlet valve, CGA 510 or CGA 350
- B: Outlet valve handle
- C: Outlet valve plug (CGA 510) or cap (CGA 350)
- D: Nitrogen-inlet valve
- E: Nitrogen-inlet valve handle
- F: Nitrogen-inlet valve cap
- G: Nitrogen-inlet adapter
- H: Outlet adapter
- I: Nitrogen-flushing tee
- J: PTFE hose with stainless steel overbraid, 1/4 in. I.D., ca. 4 ft. length
- K: Nitrogen-flushing valve
- L: Nitrogen-flushing valve handle
- M: Nitrogen-inlet adapter
- N: Auxiliary ball valve
- O: Auxiliary ball valve handle
- P: 1/8 in. ferrule lock fitting
- Q: Transfer needle
- R: Rubber septa
- S: Needle storage tube
- T: Pressure relief valve

### Storage/Stability

Cylinders should be stored upright under ~5 psig of nitrogen pressure in a well-ventilated area out of direct sunlight. Refrigerate if so stated on the product label. All valves should be closed, and capped or plugged. Blue colored cylinders should have protective covers closed and secured. Aldrich product and hazard labels should not be removed. Please do not mark directly on or place additional labels on the cylinders; use tags instead to add user information such as 'Empty' or 'In Use'.

### Preparation Instructions

Before proceeding determine which valve type has been provided with the cylinder. Then obtain the appropriate transfer-line and other parts.

#### Parts for Needle and Rubber Septa Connection

1. Transfer-line with ferrule lock end, for connecting to the CGA 510 valve (see Figure 5).
2. Transfer-line with ferrule lock end, for connecting to the CGA 350 valve (see Figure 6).
3. Transfer needle (see Table 2).
4. Rubber septa and septum-inlet adapters (see Table 2).
5. Needle storage tube (see Table 2).

**Note:** The process line/vessel must be flushed with nitrogen and connected to a mineral oil bubbler prior to connection to the liquid transfer-line.

Consult Aldrich Technical Bulletin AL-134 (Handling Air-Sensitive Reagents) for a complete description of the use of septa and needles for handling air-sensitive reagents.

**Table 2.**

Parts for Needle and Rubber Septa Connection

Catalog Number	Description
Z117765 (Legend Q)	Transfer needle, 11 ga., SS, 4 in. L (for connection to 1/8 in. ferrule lock)
Z117803 (Legend Q)	Transfer needle, 11 ga., SS, 12 in. L (for connection to 1/8 in. ferrule lock)
User Supplied (Legend S)	Needle storage tube, polyethylene tubing, 5/8 in. O.D., 1/2 in. I.D., 5–6 in. L
Z564680 (Legend R)	Sleeve stopper, bottom I.D. × O.D., 4.2 mm × 10.7 mm, white (for needle storage tube)
Z150312	Septum-inlet adapter with side arm, 24/40 joints
Z150320	Septum-inlet adapter, standard male, plain, 24/40 joints
Z553980	Precision Seal <sup>®</sup> rubber septa, white, 24/40 joints (use with Septum-inlet adapter)
Z554103	Precision Seal rubber septa, red, 24/40 joints (use with Septum-inlet adapter)
Z421480	Plug for open end of 1/8 in. ferrule lock, SS (for capping end of transfer line)
Z421510	1/4 in. MNPT to 1/8 in. ferrule lock (for converting hard connection transfer-line to needle connection/rubber septa line)

**Note:** The term 'ferrule lock' refers to the compression side of a tube fitting.

**Figure 5.**

Transfer line, CGA 510 to 1/8 in. ferrule lock, with ball valve, ca. 4 ft. length, Catalog Number Z421421 (see Table 10, Legend H through P)



**Figure 6.**

Transfer line, CGA 350 to 1/8 in. ferrule lock, with ball valve, ca. 4 ft. length, Catalog Number Z421456 (see Table 10, Legend H through P)



### Parts for Hard Connection

1. Transfer-line with 1/4 in. FNPT end, for connecting to the CGA 510 valve (see Figure 7).
2. Transfer-line with 1/4 in. FNPT end, for connecting to the CGA 350 valve (see Figure 8).
3. Adapters to connect 1/4 in. FNPT fitting at end of the transfer line to the process line/vessel (see Table 3).

**Note:** Connection to the process line/vessel should be determined before beginning the transfer procedure. See step 14.

- The process line/vessel to which the transfer line is attached should have a valve in-line in the closed position. The process system must be previously flushed with nitrogen and vented appropriately.
- Should the liquid from the cylinder be introduced to the process system at a level below that in the process vessel, a back flow prevention device is recommended. Suck-back into the cylinder may result in a serious incident.

**Figure 7.**

Transfer line, CGA 510 to 1/4 in. FNPT, with ball valve, ca. 4 ft. length, Catalog Number Z421448 (see Table 10, Legend H through N)



**Figure 8.**

Transfer line, CGA 350 to 1/4 in. FNPT, with ball valve, ca. 4 ft. length, Catalog Number Z421464 (see Table 10, Legend H through N)



**Table 3.**

Parts for Hard Connection

Catalog Number	Description
Z251461	Male connector, 1/4 in. MNPT to 1/4 in. ferrule lock, SS
Z251488	Male connector, 1/4 in. MNPT to 1/4 in. tube stub, SS
Z421472	Male hex nipple, 1/4 in. MNPT, SS
Z421499	Hex head plug, 1/4 in. MNPT (for capping end of transfer line having 1/4 in. FNPT opening)
Z421502	Pipe cap, 1/4 in. FNPT, SS (for capping end of transfer line having 1/4 in. MNPT opening)

Parts needed regardless of valve type (see Table 4).

1. Nitrogen inlet adapter for connecting the nitrogen supply hose to the cylinder.
2. PTFE sealing tape. Use on all pipe threads.
3. Grounding strap with alligator clips.
4. SNOOP<sup>®</sup> gas-leak detector.
5. Mineral spirits to aid in clean-up after transferring pyrophoric material.
6. 3/8 in. hex wrench for removing the plug from the CGA 510 outlet valve.
7. High purity grade nitrogen from two separate high purity pressure regulators and flexible tubing suitable for nitrogen supply.

**Table 4.**

Parts for Hard Connection

Catalog Number	Description
Z251313 (Legend G)	Nitrogen inlet adapter, 1/4 in. FNPT to hose barb for 1/4 in. I.D. tubing
Z148814	PTFE sealing tape, W 1/4 in.
20434	SNOOP liquid leak detector, 8 oz. (236 mL) bottle
262560	Mineral spirits, odorless
User Supplied	Nitrogen regulator, high purity type and high purity nitrogen

### Multiple Use Transfer Lines

Transfer lines can be modified for multiple uses. One can change the cylinder-outlet-adapter (see Figures 9 and 10) on the nitrogen-flushing tee to match the corresponding outlet valve. Also, a hard connection system can be converted into a needle and septa system by adding a 1/4 in. MNPT to 1/8 in. ferrule lock fitting to the auxiliary ball valve (see Table 2).

#### **Figure 9.**

Cylinder-outlet adapter for CGA 510 valve, Catalog Number Z148911 (Legend H)



#### **Figure 10.**

Cylinder-outlet adapter for CGA 350 valve Catalog Number Z251216 (Legend H)



### **Procedures**

#### Liquid Transfer

1. Read caution statements on the product label. If 'Refrigerate' is stated, store under refrigeration for several hours before proceeding to reduce any excess pressure in the cylinder.
2. Place the cylinder in a secure and upright position in a safe and well-ventilated area. If the product is to be delivered by weight, secure the cylinder on a floor scale. Ground the cylinder using an appropriate grounding strap.  
**Note:** During all nitrogen-pressure transfers, the flowing liquid can generate a static charge. Therefore, the cylinder and receiver must be connected to a suitable ground.
3. Cylinder valves are either protected with a cover or a collar. Remove the cover if necessary to access the valves.

4. Remove the tamper-evident seal from valve handle B. Make sure the liquid outlet valve A is closed by turning handle B clockwise.
5. Make sure the nitrogen-inlet/vent valve D is closed by turning handle E clockwise.
6. Carefully remove cap F from the nitrogen-inlet/vent valve D. Be sure to save this cap for later replacement.
7. Connect nitrogen-inlet adapter G to a nitrogen source using flexible tubing. Secure the tubing in place. Regulate the nitrogen pressure to 10 psig. **Note:** High purity grade nitrogen from a high purity regulator is recommended.
8. Adjust the nitrogen source to give a slow stream exiting from nitrogen-inlet adapter G and connect it to the nitrogen-inlet/vent valve D. Tighten with a wrench and check the connections using SNOOP gas-leak detector to ensure there are no leaks.
9. Close nitrogen-flushing valve K by turning handle L clockwise until it is completely closed.
10. Connect a second nitrogen source using flexible tubing to the hose fitting M on valve K. Secure the tubing in place. Regulate the nitrogen pressure to 3–4 psig.
11. Open auxiliary valve N (if closed) by turning handle O counter-clockwise until it is parallel to the valve body.  
**Note:** Auxiliary valve N is provided as a back up method of stopping the material flow in an emergency and for closing the line at the end of the procedure. Otherwise use the methods given in this procedure to control the flow rate.
12. Open nitrogen-flushing valve K and adjust the nitrogen source to give a steady stream of nitrogen exiting from the open ends of the transfer line. Allow the transfer line to flush while proceeding.
13. Slowly and carefully remove cap or plug C from the liquid outlet valve A. The CGA 510 valve has a plug for female left-handed threads and the CGA 350 valve has a cap for male left-handed threads. Turn either clockwise to remove.  
**Caution!** Occasionally there may be liquid or solid under the cap, and some fuming may occur with more reactive reagents. Remove any solid from the valve opening by washing with a stream of odorless mineral spirits from a wash bottle and use a wire brush to clean the inside threads, if necessary. Avoid thread damage. Wear appropriate protective equipment.
14. Proceed to the appropriate section based on the type of connection, either Needle and Rubber Septa Connection, or Hard Connection.

### Liquid Transfer with Needle and Rubber Septa Connection

1. Connect needle Q to the ferrule lock P at the end of the transfer line by removing the nut, sliding it up the needle shaft, and tightening it finger tight. Then tighten the nut with a wrench an additional 1 1/4 turns. Hold the body with a second wrench to prevent it from turning.  
Note: It is helpful to mark the nut to facilitate counting the number of turns.
2. Place a rubber septum R on one end of a needle storage tube S and wire it in place. Support the tube vertically in a fume hood or other protected location with the septum on the upper end.
3. Insert needle Q into the septum R of the needle storage tube S and allow the transfer line, needle, and storage tube to flush for several more minutes.
4. Cap the open end of the storage tube with another septum and wire in place.
5. With nitrogen still flushing from adapter H, connect it to the liquid outlet valve A and tighten with a wrench  
Notes: Left-hand threads turn counter-clockwise to install.  
Connect so that the nitrogen-flushing valve K is pointing up. Avoid kinking the transfer line, which may damage it and result in potential leaks.
6. Increase the pressure to the nitrogen-inlet adapter M on the transfer line to 10 psig.
7. Check all connections in the entire system with SNOOP to ensure there are no leaks.
8. Reduce the pressure to fitting M on the transfer line back to 3–4 psig.
9. Close nitrogen-flushing valve K.
10. Remove needle Q from the needle storage tube S and insert it into the septum on the septum-inlet adapter, which is on a clean, dry, nitrogen-flushed process vessel. Push the needle into the system until the end is beyond any fitting between the process vessel and adapter.  
Note: The process vessel should have been flushed previously with nitrogen and connected to a mineral oil bubbler.
11. Cautiously open outlet valve A by turning handle B counter-clockwise and watch the end of the needle and the level of mineral oil in the exit bubbler from the apparatus. If liquid flow is not observed from the needle or if the oil level rises (suck-back) in the center tube of the mineral oil bubbler, immediately turn off valve A and open inlet valve D by turning handle E counter-clockwise. This will pressurize the vapor space in the cylinder to 10 psig. Return to the start of step 11. If liquid flow is observed, continue on to step 12.

12. When the desired amount of liquid has been transferred, close outlet valve A and auxiliary valve N and then close nitrogen-inlet valve D (if open). During the transfer, inlet valve D can be opened and closed as needed to maintain a reasonable flow of product from the needle.
13. The needle can now be removed from the septum on the process vessel.  
Note: If a pyrophoric liquid is being transferred, flush the line with nitrogen as described in steps 14 and 15 before removing the needle. If this is not done, liquid may drip from the needle when it is removed, which can result in a fire.  
The needle may be inserted into a septum on another process vessel or it can be placed in the needle storage tube for short-term storage (less than a few hours). For longer storage or when the cylinder is empty, liquid should be flushed from the transfer line as described in steps 14 and 15.
14. With the needle still in the process vessel or inserted in a septum on a suitable receiver, open auxiliary valve N and nitrogen-flushing valve K to flush residual material from the transfer line. Flush the line for 5–10 minutes while lifting the transfer line to prevent liquid from remaining in low areas.
15. Close nitrogen-flushing valve K followed by auxiliary valve N. Remove the needle from the process vessel/receiver, and place it into the needle storage tube or another process vessel if transfer is to continue.
16. Continue to Clean-Up section.

### Liquid Transfer with Hard Connection

1. While the transfer line is being flushed, connect outlet adapter H to the liquid outlet valve A and tighten with a wrench.  
Notes: Left handed threads turn counter-clockwise to install.  
Connect so that nitrogen-flushing valve is pointing up. Avoid kinking the transfer line, which may damage it and result in potential leaks.
2. Allow the transfer line to flush with nitrogen for 15 minutes.
3. Check to ensure the valve in-line to the process line/vessel is closed.
4. With nitrogen still flushing through the transfer line, connect it to the process line/vessel.
5. Check to ensure the auxiliary valve N is open (handle O is parallel to valve body).
6. Increase the pressure to fitting K on the transfer line to 10 psig.
7. Check all connections in the entire transfer line with SNOOP to ensure there are no leaks.
8. Reduce the pressure to fitting K on the transfer line back to 3–4 psig.

9. Close nitrogen-flushing valve K. The transfer line is now ready for the liquid transfer.
10. Verify the process system has been prepared for the transfer and then open the valve in-line to the process line/vessel.
11. Cautiously open liquid outlet valve A by turning the handle B counter-clockwise. Liquid should begin to flow from the cylinder through the transfer line and into the process system. Flow can be detected by visual inspection through a sight glass on the process system or by weight loss from the cylinder if on a floor scale.  
Note: If flow is not detected or if the flow is slow, Open nitrogen inlet/vent valve D by turning handle E counter-clockwise. This will pressurize the vapor space in the cylinder with nitrogen to 10 psig. During the transfer, inlet valve D can be opened and closed as needed to maintain a reasonable flow of product.  
**Caution!** Wear appropriate personal protective equipment throughout the entire transfer procedure.
12. Continue the transfer as appropriate. If the flow rate becomes slower than desired, return to step 11. When the desired amount of liquid has been transferred, close liquid-outlet valve A by turning handle B clockwise and then close the nitrogen-inlet valve D (if open) by turning handle E clockwise.
13. Open flushing valve K to flush residual liquid from the transfer line and into the process system. Flush the line for 5–10 minutes while lifting the transfer line to prevent any liquid from remaining in low areas of the line.
14. Close flushing valve K and then close auxiliary valve N. Then close the valve in-line to the process system.
15. Continue to Clean-Up section.

#### Clean-Up

**Caution!** Due to the hazardous nature of many products contained in Kilo-Lab cylinders, appropriate personal protective equipment must be worn throughout the entire transfer procedure, including clean-up.

1. Verify the nitrogen-flushing valve K and auxiliary valve N are closed and then remove the nitrogen line attached to nitrogen-inlet adapter M.
2. Verify the liquid outlet valve A is closed. If the connection to the process line/vessel was with a needle remove the needle storage tube, still holding the needle, from its support. For a hard connection, disconnect the end of the transfer line from the process line/vessel. Immediately cap both the open end of the transfer line and the open connection to the process line/vessel (see Table 3 for transfer line caps).  
**Caution!** If the reagent is highly reactive with air, some fuming may result. It is necessary to cap the open ends immediately to prevent a fire. Be sure to take the appropriate precautionary measures when cleaning the process line/vessel system. Wear personal protective equipment. Fire retardant clothing is recommended when handling pyrophoric materials.
3. If the reagent in the cylinder is pyrophoric or water-reactive, carefully remove the cylinder with attached transfer apparatus to a safe location, preferably outside, away from all flammable or combustible materials.
4. Cautiously remove the liquid-outlet adapter H from outlet valve A. Turn clockwise.  
**Caution!** A small amount of liquid may remain behind in the valve opening. If the reagent is highly reactive with air, a small fire of short duration or fuming may result.
5. Cleaning the Transfer Line:  
Note: The transfer line should be cleaned as soon as possible after it is removed from the cylinder. If this is not done, partially hydrolyzed material will often plug the ends of the line while the inner material remains active. This can cause problems when the transfer line is eventually cleaned.
  - a. Reagent is not pyrophoric or water-reactive - Move the transfer line to a well-ventilated area and clean the transfer line following normal procedures for process equipment. Work in a well-ventilated area using appropriate personal protective equipment.

- b. Reagent is pyrophoric or water-reactive - Place the transfer line in an empty metal tub and carry to a safe distance from the cylinder, preferably outside, away from other flammables/combustibles.
- i. Keep the transfer line outside, remove the needle storage tube or cap from the end of the transfer line, and open nitrogen-flushing valve K and auxiliary valve N.
  - ii. While still outdoors, rinse the transfer line with a stream of odorless mineral spirits into an empty, dry metal bucket. Open and close the valves several times during rinsing.  
**Caution!** If the product is pyrophoric, this sometimes results in fire.
  - iii. After the rinse with odorless mineral spirits, flush the transfer line with water, dilute acid (if needed to dissolve solids formed by hydrolysis), water, and finally methanol or acetone. Open and close the valves several times during rinsing.  
**Caution!** If the product is pyrophoric, this sometimes results in fire.  
Note: Be sure water contacts all surfaces of the transfer line to ensure complete hydrolysis of reactive material. Operate all valves on the transfer line while running water through the valves to ensure complete hydrolysis within the valve housing. After cautiously rinsing the transfer line with water, it is recommended to completely submerge the equipment in water.
  - iv. The transfer line can be brought inside for a final clean up following normal procedures for process equipment.
  - v. Verify that all rinses in the bucket(s) have been completely hydrolyzed before following the appropriate disposal procedures.
6. Return to the cylinder and rinse the inside of the valve opening with a stream of odorless mineral spirits from a wash bottle. Clean the threads if necessary using a small wire brush to remove any solid.  
Note: Do not open or remove valves while cleaning. Do not clean the inside of the cylinder.
  7. If necessary, clean the threads on the cap or plug C, and replace on outlet valve A. Turn counter-clockwise. Tighten with a wrench.
  8. Verify all valves on the cylinder are closed and that all caps or plugs are in place and tightened. Remove any chemical residue from the top and sides of the cylinder. Close the protective cover and secure it in place (blue colored cylinders only).  
Note: Do not over tighten caps or plugs. Do not attempt to clean the inside of the cylinder. The cylinder is returned with product residue.
  9. The cylinder can now be returned to storage or shipped back to Sigma-Aldrich.

#### Cylinder Return

To return cylinders to Sigma-Aldrich, the cylinder must be empty (except for residual product) with all valves in the closed position and all valves capped or plugged. A waste disposal charge may be assessed for returned product. Remove any residual chemical from the outside of the cylinder. If the cylinder was delivered with a cover (blue colored carbon steel version), replace it securely. Empty cylinders contain product residue that is fully regulated as hazardous material and must be shipped in accordance with all applicable shipping regulations.

Cylinders must be returned empty and in good condition within 6 months to receive a full credit of the deposit amount. Please contact our Technical Service department at 800-231-8327 with any questions regarding the return of a Kilo-Lab cylinder.

**Return empty cylinders to:**  
Sigma-Aldrich Corporation  
5485 County Road V  
Sheboygan Falls, WI 53085-2814

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SNOOP is a registered trademark of Swagelok Co.

## Appendix Accessory Equipment for Transfer of Liquids

### Cylinder System Components

Type	Connection	Catalog Number
Cylinder inlet valve, brass	1/4 in. NPTM × 1/4 in. SAE fittings with cap	Z148857
Cylinder outlet valve, brass	3/4 in. NPTM × CGA 510 with plug	Z148865
Cylinder plus protective cover	3/4 in. NPTM × CGA 510 with plug	Z148881
Dip tube, SS, angle-cut end	1/4 in. NPTM × 13.5 in. L, for 8 and 18 L cylinders	Z151645
Fusible plug, brass	1/4 in. NPTM, melting range 338–388 °F	Z148903
Pressure-relief valve, brass	1/4 in. NPTM, set to release at 200 psi	Z150096

### Adapters



Z150185

Z150193

Z148938

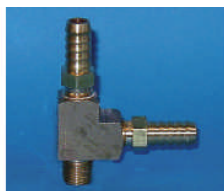
Z150150

Z118168

Type	Connection	Catalog Number
Cylinder inlet, brass	SAE union nut for 1/4 in. O.D. tubing	Z150185
	SAE nut × 1/4 in. O.D. tubing, 4 in. L, for use as hose connector	Z150193
Cylinder outlet, brass	CGA 510 × 1/4 in. NPTM	Z148911
	CGA 510 × hose connector for 1/4 in. I.D. tubing	Z148938
Cylinder outlet T, SS - Use in conjunction with needle tubing connectors for removal of liquids from the cylinder.	CGA 510 × 1/4 in. O.D. tubing	Z150150
Septum-inlet, straight, brass	1/4 in. NPTM × 6 mm I.D. septum inlet	Z118141
	1/4 in. NPTM × 13 mm I.D. septum inlet	Z118192
Septum-inlet, straight, SS	1/4 in. NPTM × 6 mm I.D. septum inlet	Z118168
Septum-inlet, T, brass	1/4 in. NPTM × 6 mm I.D. septum inlet	Z118206
Septum-inlet, glass	24/40 standard male × 14 mm I.D. septum inlet	Z150320
	24/40 × 14 mm I.D. septum inlet with 6 mm I.D. septum inlet side arm	Z150312
	24/40 × 14 mm I.D. septum inlet with PTFE stopcock	Z150355
	24/40 × 14 mm I.D. septum inlet with PTFE stopcock and 6 mm I.D. septum inlet side arm	Z150339



Z118192



Z118206



Z150320



Z150312



Z150355



Z150339

### Precision Seal Septa

For use with	Catalog Number	
	White	Red
6 mm I.D. (8 mm O.D.) septum inlets	Z553913	Z554030
7 mm I.D. (10 mm O.D.) septum inlets	Z553921	Z554049
13 or 14 mm I.D. septum inlets	Z553948	Z554057
24/40 glass joints	Z553980	Z554103



### Connectors

These connectors (see Figures 11 and 12) are used in conjunction with the cylinder-outlet adapters to fabricate a variety of transfer lines for removing liquids from Kilo-Lab cylinders. Also, they can be used in pairs with copper, polyethylene, or PTFE tubing to provide very convenient and useful double-tipped lines for nitrogen-pressure transfer of air-sensitive liquids.

**Figure 11.**

Needle-tubing with brass compression fitting



Luer lock connection, for 1/4 in. O.D. copper tubing, Catalog Number Z150010

**Figure 12.**

Perfektum needle-tubing



Male Luer lock to tube, for 1/4- 5/16 in. I.D. tubing, Catalog Number Z101168

### Transfer Lines

Convenient, fully assembled lines for removing liquid from Kilo-Lab cylinders. For needle transfer, lines consist of a brass CGA 510 fitting connected to a 48 in. length of metal braided PTFE tubing connected to a metal ball valve with metal needle connector. The 'T' is placed in line and is equipped with a needle valve and 6 mm I.D. septum inlet for nitrogen flush of transfer line. For hard transfer a 1/4 in. transfer line is assembled with a flushing tee with CGA 350 adapter.

Pipe and Valves	Needle Connection	Catalog Number
Brass	Luer lock	Z150215
Brass	1/8 in. ferrule lock	Z150231
SS	1/8 in. ferrule lock	Z150258
Brass	3/16 in. ferrule lock	Z150266
SS	3/16 in. ferrule lock	Z150274



**Needles**

These stainless steel transfer needles are used with the various needle-tubing connectors to provide the means to penetrate a rubber septum giving an airtight seal for nitrogen pressure transfer of air-sensitive liquids.

Gauge	Length (in.)	Catalog Number
Luer hub, non-coring (deflecting) tip		
18	2	Z113042
	4	Z117099
	6	Z102717
	10	Z117102
	12	Z101141
	24	Z100862
17	3.5	Z113050
16	2	Z117064
	4	Z117072
	6	Z108782
	10	Z117080
	12	Z108790
	24	Z100870
14	2	Z117005
	4	Z117013
	6	Z117021
	10	Z117048
	12	Z117056
	24	Z126748
12	2	Z116947
	4	Z116955
	6	Z116963
	10	Z116971
	12	Z116998
	24	Z126721

Gauge	Length (in.)	Catalog Number
1/8 in. ferrule, standard point		
11	4	Z117765
	12	Z117803

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