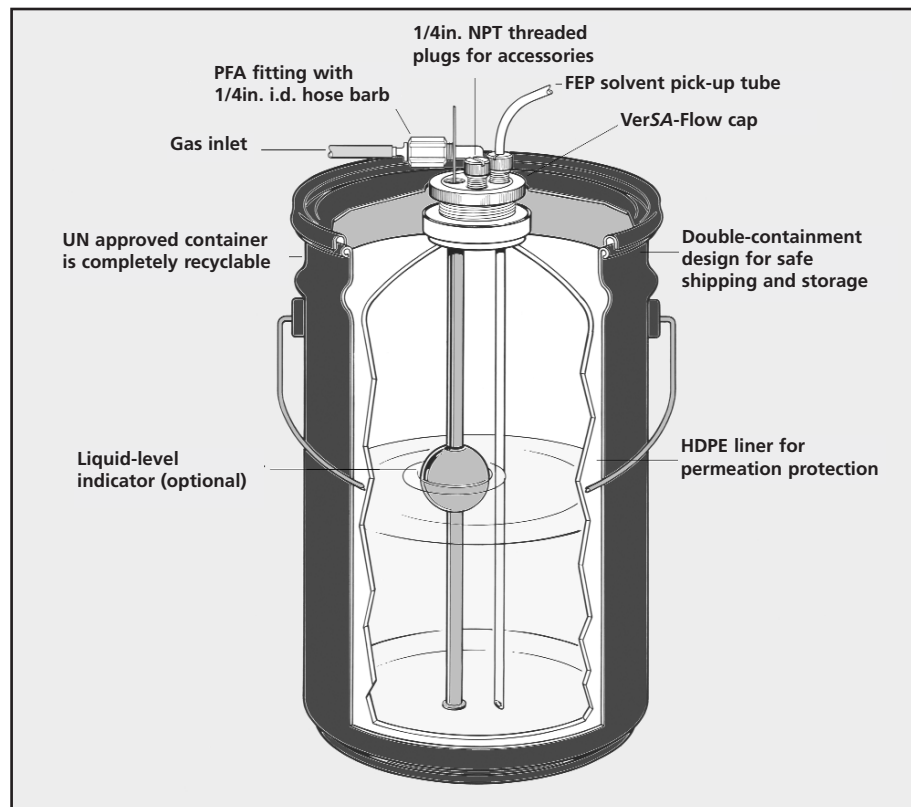


AL-210

Technical Bulletin

VerSA-Flow™ Can and Drum Dispensing Systems

Aldrich VerSA-Flow dispensing systems provide convenient methods for transferring and dispensing laboratory and development scale quantities of solvents, fine organics, and other liquids from various Aldrich containers using the equipment and techniques described in this bulletin.



Cutaway view of an 18L poly-lined steel can with low-flow VerSA-Flow dispenser cap and optional liquid-level indicator.

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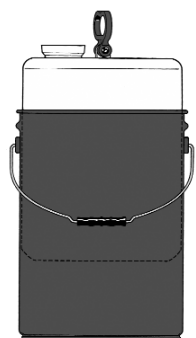
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CONTAINER SPECIFICATIONS

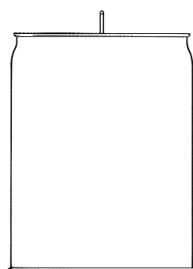
VerSA-Flow dispensers are available to fit the Aldrich cans and drums shown in Figure 1. Table 1 provides specifications for the containers. All of these containers are one-way, disposable units, and when empty, may be recycled or utilized for waste solvent collection with the appropriate VerSA-Flow cap.

CAUTION! These containers are suited only for low-pressure (2-4psi) transfer techniques. Read and closely follow the pressure-transfer procedures described in this bulletin, regardless of the quantity needed or the chemical transferred. Since many of the products packaged in these containers are hazardous, they must be handled while using appropriate personal protective equipment. See the Equipment section of the Aldrich Handbook for a complete listing of chemically resistant gloves, aprons, goggles, face shields, and respirators.

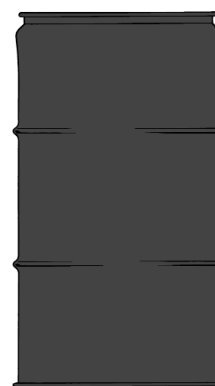
Figure 1
Aldrich Containers



18L Poly-Lined Can



20L Steel Can



25L Steel Can and 50L, 100L,
200L Poly-Lined Drums

Table 1
SPECIFICATIONS FOR ALDRICH CONTAINERS

Container Type	Capacity	Overall dim. H x diam. (in.)	Plug Size
Poly-lined steel can	18L	16.25 x 11.75	2in. buttress thread
Carbon steel can	20L	14.5 x 11	2in. NPT thread
Stainless steel can	25L	20.75 x 10.75	2in. NPT thread
Poly-lined steel drum	50L	26.25 x 14.25	2in. NPT thread
Poly-lined steel drum	100L	30 x 18.5	2in. NPT thread
Poly-lined steel drum	200L	36 x 23.5	2in. NPT thread

VERSA-FLOW DISPENSER SELECTION GUIDE

VerSA-Flow dispenser options for the various Aldrich containers are shown in Table 2. Figure 2 provides specifications for each dispenser type. Figure 3 shows other configurations of the VerSA-Flow pressure-delivery caps which are available on request.

Container Type	Applications	Cat. No.
Poly-lined steel can, 18L, 2in. buttress thread		
A. Hand pump*	Low-flow dispensing	Z52,906-0
B. Economy pressure-delivery cap*	Low-flow transfer, waste solvent collection	Z52,902-8
Can thread adapter, 2in. NPTF to buttress	*Required for above pump and cap	Z52,903-6
C. Low-flow pressure-delivery cap	Low-flow transfer/dispensing	Z54,381-0
D. High-flow pressure-delivery cap	High-flow transfer	Z55,318-2
Steel cans, 20L, 25L, and poly-lined steel drums, 50L, 100L, and 200L, 2in. NPT thread		
A. Hand pump	Low-flow dispensing	Z52,906-0
B. Economy pressure-delivery cap	Low-flow transfer, waste solvent collection	Z52,902-8
C. Low-flow pressure-delivery cap	Low-flow transfer/dispensing	Z54,573-2
D. High-flow pressure-delivery cap	High-flow transfer	Z54,579-1

FIGURE 2 - SPECIFICATIONS FOR VERSA-FLOW DISPENSERS

A. Hand pump dispenser

Simple pumping action pressurizes container to dispense solvent. Fits Aldrich cans and drums with 2in. NPT threads. Pump can be adapted to 2in. buttress threads with optional thread adapter Z52,903-6.

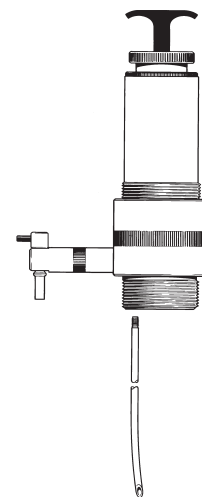
- Machined PBT body and piston with PTFE wiper
- 30in. L PTFE solvent pick-up tube and On/Off spigot
- Built-in pressure-relief valve

Pump with 2in. NPT thread

Z52,906-0

Thread adapter, 2in. NPTF to 2in. buttress threads

Z52,903-6

**B. Economy pressure-delivery cap**

For low-flow pressure-delivery of solvents and for waste solvent collection using Aldrich cans and drums with 2in. NPT threads. Solid machined PBT body. Use at <5psi max.

- Flow rate: approx. 1L/min at 4psi
- Includes 10ft x ¼in. o.d. FEP tubing, adjustable depth through compression fittings on cap
- Can be adapted to 2in. buttress threads with optional thread adapter Z52,903-6

Cap with 2in. NPT thread

Z52,902-8

Thread adapter, 2in. NPTF to 2in. buttress threads

Z52,903-6

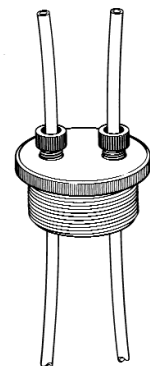


FIGURE 2 - SPECIFICATIONS FOR VERSA-FLOW DISPENSERS (CONTINUED)

C. Low-flow pressure-delivery cap

For low-flow pressure-delivery of solvents from Aldrich cans and drums with 2in. NPT threads or 2in. buttress threads. Precision machined, two-piece, PBT cap with special threading that permits the removal of the cap without disconnecting solvent and gas lines when changing containers.

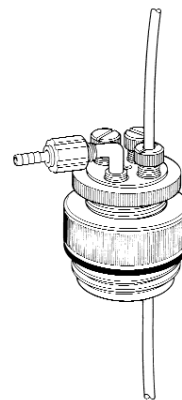
- Flow rate: approx. 1 L/min at 4psi
- Includes 10ft x ¼in. o.d. FEP solvent pick-up tubing, adjustable depth through compression fitting on cap
- ¼in. i.d. gas hose connection
- Extra 90° PFA elbow with ¼in. o.d. compression fittings for connecting pick-up tubing to cap in low-clearance applications
- Two additional ¼in. NPT threaded holes with plugs permit the addition of a liquid-level indicator, vent line, or sparge/delivery tube assemblies
- Built-in pressure-relief valve vents automatically in case of excessive pressure (5psi max.)
- Optional ⅜in. o.d. compression fittings for HPLC tubing

Cap with 2in. NPT thread

Z54,573-2

Cap with 2in. buttress thread

Z54,381-0

**D. High-flow pressure-delivery cap**

For high-flow pressure-delivery of solvents from Aldrich cans and drums with 2in. NPT threads or 2in. buttress threads. Precision machined, two-piece, PBT cap with special threading that permits the removal of the cap without disconnecting solvent and gas lines when changing containers.

- Flow rate: approx. 5 to 6 L/min at 4psi
- Includes 8ft x ⅜in. i.d. FEP solvent pick-up tubing, adjustable depth through compression fitting on cap
- On/Off spigot
- ¼in. i.d. gas hose connection
- Built-in pressure-relief valve vents automatically in case of excessive pressure (10psi max.)

Cap with 2in. NPT thread

Z54,579-1

Cap with 2in. buttress thread

Z55,318-2

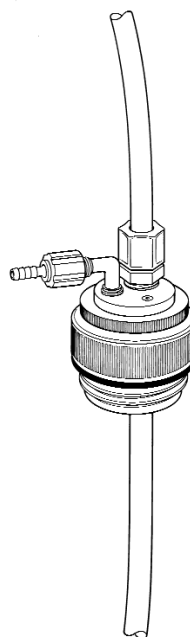
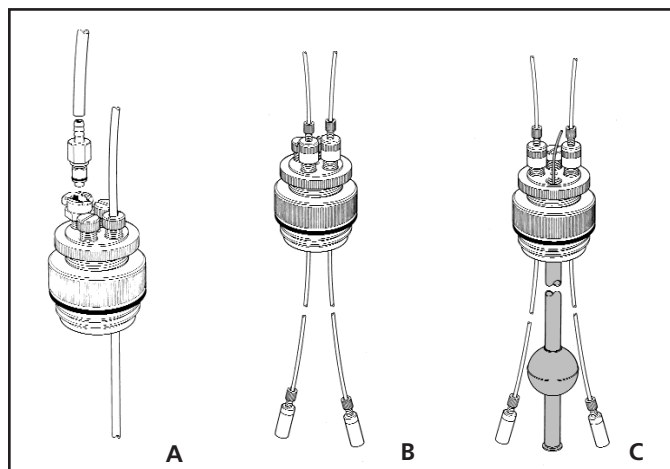


FIGURE 3 - OPTIONAL VERSA-FLOW DISPENSER CONFIGURATIONS

- A. Low-flow cap with quick-disconnect fitting for flexible gas-inlet tubing.
- B. Low-flow cap with ⅜in. o.d. FEP sparge and solvent pick-up tubes each with 2 micron SS filters. For delivery of solvents directly to HPLC instruments.
- C. Low-flow cap with ⅜in. o.d. FEP sparge and solvent pick-up tubes each with 2 micron SS filters and liquid-level indicator. For delivery of solvents directly to HPLC instruments.



HANDLING

The user of VerSA-Flow dispensers should be a fully qualified and experienced laboratory or chemical technician or production worker. User should be aware of the hazardous nature of many of the products that may be dispensed with these systems. The material safety data sheet (MSDS), which is provided with each Aldrich chemical product, must be read and understood by the user prior to the installation or use of VerSA-Flow dispensers.

In general, VerSA-Flow pressure-delivery caps should be used at low pressure (2-4psi) using a pressure-regulated nitrogen supply. During nitrogen pressure-transfers, the flowing liquid can generate a static charge. Therefore, metal cans and drums and receivers must be connected to a suitable ground. See the VerSA-Flow Accessories section for various lengths of flat braided bare cable with copper clips at each end which makes a convenient grounding strap.

LOW-FLOW PRESSURE-TRANSFER PROCEDURES

CAUTION! Due to the hazardous nature of many chemicals packaged in Aldrich steel cans and drums, the user must exercise caution to prevent inhalation of chemical vapors or direct contact with skin during system set up and transfer. During pressure-transfer procedures it is recommended that operators wear appropriate personal protective equipment such as chemically-resistant gloves, goggles, splash apron, full face shield plus any additional protective equipment as required. See the Equipment section of the Aldrich Handbook for a complete listing of these items. The operator should be a fully qualified and experienced laboratory or chemical technician or production worker.

18L POLY-LINED CANS

Step 1.

Place the container in a secure and upright position in a safe and well ventilated area. If the product is to be delivered by weight, secure the container on an appropriate scale.

Step 2.

Remove the protective metal shipping cover on the can.

Step 3.

Remove the 2in. plug from the inner poly container with a plug wrench and set aside for re-use after transfer.

Step 4.

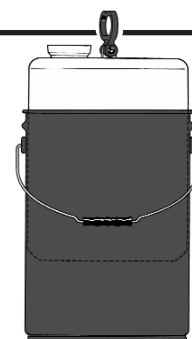
Separate the top cap from the lower cap by turning the center nut counterclockwise. Observe the Viton® O-ring within the lower part of the cap assembly and use care to ensure that it remains in position during the next step.

Step 5.

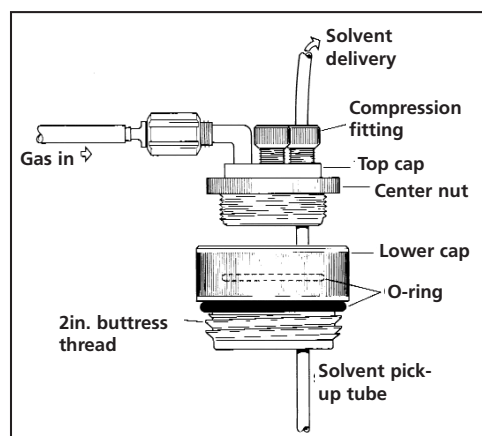
Install the lower cap in the poly container opening by carefully turning cap clockwise, then tighten securely by hand. Make sure that the cap is threaded into container opening properly to avoid cross-threading (damaging) the container threads.

Step 6.

Install optional one-hole metal can cover, aligning hole with cap bottom installed in Step 5. **Note:** Check local fire codes to determine if use of cover is required in your laboratory.



18L Poly-Lined Can



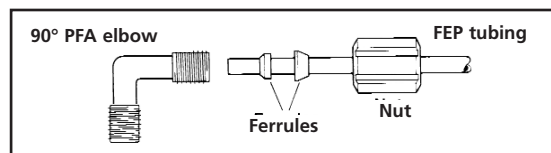
Low-Flow Pressure-Transfer Procedures - 18L Poly-Lined Cans (continued)

Step 7.

Adjust the depth of the FEP solvent pick-up tubing by loosening the compression fitting on the top cap and pushing the tubing to a length that just reaches the bottom of the container. Hand tighten the compression fitting to secure the tubing position. Carefully lower the solvent pick-up tubing into the container and install top cap into lower cap (installed in Step 5) by turning the center nut on the top cap clockwise, then tighten center nut securely by hand. Use care during installation of top cap to prevent cross-threading.

OPTION:

A 90° PFA elbow with ¼ in. o.d. compression fittings is supplied with the cap. It can be used for connecting the solvent pick-up tubing to the cap in low-clearance applications. To use the elbow, make sure the FEP solvent pick-up tubing depth is properly adjusted as above, then cut the tubing about one inch above the compression fitting on the top cap. Connect the elbow to the cut end using the ferrules and nut. Connect FEP tubing to the other elbow end as shown in the diagram to continue the delivery line to the reaction vessel or storage flask.

**Step 8.**

Run the open end of solvent pick-up tubing to a receiving vessel or flask. **Note:** Torion™ tubing adapters provide a convenient, closed system connection of tubing to reaction vessels and storage flasks. Alternatively an On/Off spigot may be attached to the end of the tubing for dispensing. See the Accessories section for a listing of these products. If a spigot is installed, turn it to the Off position.

Step 9.

Connect ¼ in. i.d. flexible gas line tubing to the hose barb on the top cap. **CAUTION! Do not clamp or wire the gas line tubing to the hose barb.** The hose barb allows the gas tubing to safely pop off in the event of excessive over-pressure during transfer. Connect the other end of the gas line tubing to a pressure-regulated (2-4psi) nitrogen supply.

Step 10.

Check that all cap connections are hand tight, including the two solid ¼ in. NPT plugs (if present). Teflon® tape may be used to seal NPT threads if necessary.

Step 11.

Slowly turn on nitrogen supply to pressurize the container and cause solvent to begin flowing out of the pick-up tubing and into the receiving vessel. **Note:** if an On/Off spigot is used, open spigot slightly to allow trapped gas in the tubing to escape, then open spigot fully to dispense solvent. The built-in pressure-relief valve will automatically vent if gas pressure exceeds 5psi. This is normal and prevents the buildup of unsafe pressures inside container. Adjust nitrogen supply to a lower pressure (2 to 4psi) and continue transfer.

Step 12.

When the solvent transfer is complete, turn off nitrogen gas and allow remaining solvent in the pick-up tubing to drain. Disconnect gas line tubing. Carefully remove cap assembly from the can and place into a fume hood to dry. Avoid solvent contact with skin or breathing vapors when handling the cap assembly and tubing.

Step 13.

Replace the 2in. plug into the inner poly container and tighten with a plug wrench. Remove the metal one-hole cover and install the protective metal shipping cover on the can.

Step 14.

Discard the empty can or use for the collection of waste solvents. The economy VerSA-Flow cap, Z52,902-8, is well suited for waste solvent collection from instruments or reaction vessels.

Low-Flow Pressure-Transfer Procedures - 20L, 25L Steel Cans and 50L, 100L, and 200L Poly-Lined Drums

CAUTION! Due to the hazardous nature of many chemicals packaged in Aldrich steel cans and drums, the user must exercise caution to prevent inhalation of chemical vapors or direct contact with skin during system set up and transfer. During pressure-transfer procedures it is recommended that operators wear appropriate personal protective equipment such as chemically-resistant gloves, goggles, splash apron, full face shield plus any additional protective equipment as required. See the Equipment section of the Aldrich Handbook for a complete listing of these items. The operator should be a fully qualified and experienced laboratory or chemical technician or production worker.

20L, 25L STEEL CANS AND 50L, 100L, AND 200L POLY-LINED DRUMS

Step 1.

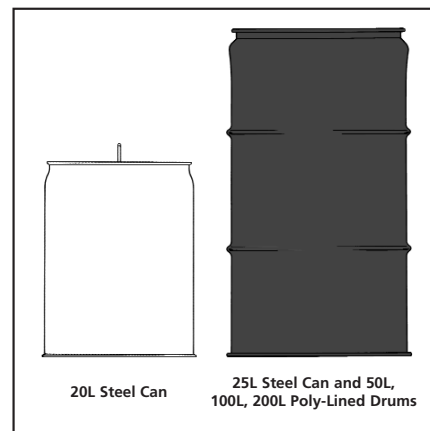
Place the container in a secure and upright position in a safe and well ventilated area. If the product is to be delivered by weight, secure the container on an appropriate scale.

Step 2.

Remove the 2in. plug from the container with a plug wrench and set aside for re-use after transfer.

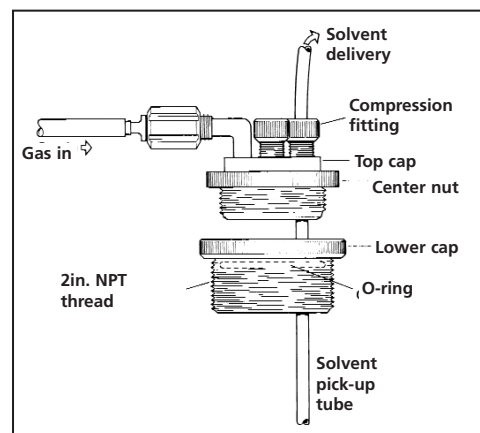
Step 3.

Separate the top cap from the lower cap by turning the center nut counterclockwise. Observe the Viton® O-ring within the lower part of the cap assembly and use care to ensure that it remains in position during the next step.



Step 4.

Install the lower cap in the container opening by carefully turning cap clockwise, then tighten securely by hand. Make sure that the cap is threaded into container opening properly to avoid cross-threading (damaging) the container threads. If container thread damage is suspected due to cross-threading, remove the cap and wrap the threads of the lower cap with several turns of Teflon® tape, then reinstall as above.

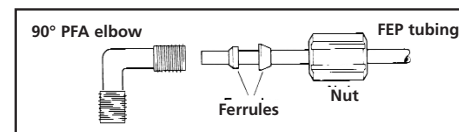


Step 5.

Adjust the depth of the FEP solvent pick-up tubing by loosening the compression fitting on the top cap and pushing the tubing to a length that just reaches the bottom of the container. Hand tighten the compression fitting to secure the tubing position. Carefully lower the solvent pick-up tubing into the container and install top cap into lower cap (installed in Step 4) by turning the center nut on the top cap clockwise, then tighten center nut securely by hand. Use care during installation of top cap to prevent cross-threading.

OPTION:

A 90° PFA elbow with ¼ in. o.d. compression fittings is supplied with the cap. It can be used for connecting the solvent pick-up tubing to the cap in low-clearance applications. To use the elbow, make sure the FEP solvent pick-up tubing depth is properly adjusted as above, then cut the tubing about one inch above the compression fitting on the top cap. Connect the elbow to the cut end using the ferrules and nut. Connect FEP tubing to the other elbow end as shown in the diagram to continue the delivery line to the reaction vessel or storage flask.



Low-Flow Pressure-Transfer Procedures - 20L, 25L Steel Cans and 50L, 100L, and 200L Poly-Lined Drums (continued)

Step 6.

Run the open end of solvent pick-up tubing to a receiving vessel or flask. **Note:** Torion™ tubing adapters provide a convenient, closed system connection of tubing to reaction vessels and storage flasks. Alternatively an On/Off spigot may be attached to the end of the tubing for dispensing. See the Accessories section for a listing of these products. If a spigot is installed, turn it to the Off position.

Step 7.

Connect ¼ in. i.d. flexible gas line tubing to the hose barb on the top cap. **CAUTION! Do not clamp or wire the gas line tubing to the hose barb.** The hose barb allows the gas tubing to safely pop off in the event of excessive over-pressure during transfer. Connect the other end of the gas line tubing to a pressure-regulated (2-4psi) nitrogen supply.

Step 8.

Check that all cap connections are hand tight, including the two solid ¼ in. NPT plugs (if present). Teflon® tape may be used to seal NPT threads if necessary.

Step 9.

Slowly turn on nitrogen supply to pressurize the container and cause solvent to begin flowing out of the pick-up tubing and into the receiving vessel. **Note:** if an On/Off spigot is used, open spigot slightly to allow trapped gas in the tubing to escape, then open spigot fully to dispense solvent. The built-in pressure-relief valve will automatically vent if gas pressure exceeds 5psi. This is normal and prevents the buildup of unsafe pressures inside container. Adjust nitrogen supply to a lower pressure (2 to 4psi) and continue transfer.

Step 10.

When the solvent transfer is complete, turn off nitrogen gas and allow remaining solvent in the pick-up tubing to drain. Disconnect gas line tubing. Carefully remove cap assembly from the can and place into a fume hood to dry. Avoid solvent contact with skin or breathing vapors when handling the cap assembly and tubing.

Step 11.

Replace the 2in. plug into the container and tighten with a plug wrench. Discard the empty container or use for the collection of waste solvents. The economy VerSA-Flow cap, Z52,902-8, is well suited for waste solvent collection from instruments or reaction vessels.

HIGH-FLOW PRESSURE-TRANSFER PROCEDURES

CAUTION! Due to the hazardous nature of many chemicals packaged in Aldrich steel cans and drums, the user must exercise caution to prevent inhalation of chemical vapors or direct contact with skin during system set up and transfer. During pressure-transfer procedures it is recommended that operators wear appropriate personal protective equipment such as chemically-resistant gloves, goggles, splash apron, full face shield plus any additional protective equipment as required. See the Equipment section of the Aldrich Handbook for a complete listing of these items. The operator should be a fully qualified and experienced laboratory or chemical technician or production worker.

18L POLY-LINED CANS

Step 1.

Place the container in a secure and upright position in a safe and well ventilated area. If the product is to be delivered by weight, secure the container on an appropriate scale.

Step 2.

Remove the protective metal shipping cover on the can.

Step 3.

Remove the 2in. plug from the inner poly container with a plug wrench and set aside for re-use after transfer.

Step 4.

Separate the top cap from the lower cap by turning the center nut counterclockwise. Observe the Viton® O-ring within the lower part of the cap assembly and use care to ensure that it remains in position during the next step.

Step 5.

Install the lower cap in the poly container opening by carefully turning cap clockwise, then tighten securely by hand. Make sure that the cap is threaded into container opening properly to avoid cross-threading (damaging) the container threads.

Step 6.

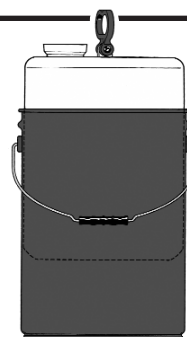
Install optional one-hole metal can cover, aligning hole with cap bottom installed in Step 5. **Note:** Check local fire codes to determine if use of cover is required in your laboratory.

Step 7.

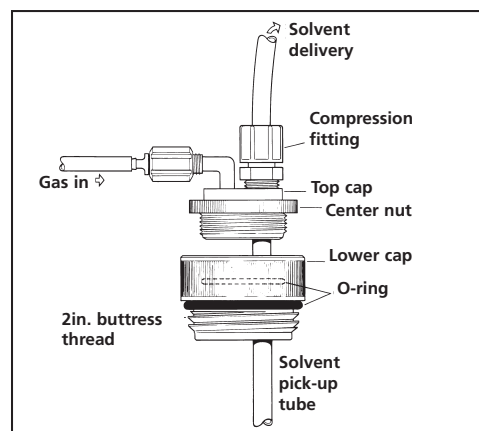
Adjust the depth of the FEP solvent pick-up tubing by loosening the compression fitting on the top cap and pushing the tubing to a length that just reaches the bottom of the container. Hand tighten the compression fitting to secure the tubing position. Carefully lower the solvent pick-up tubing into the container and install top cap into lower cap (installed in Step 5) by turning the center nut on the top cap clockwise, then tighten center nut securely by hand. Use care during installation of top cap to prevent cross-threading.

Step 8.

An On/Off spigot is attached on the end of the solvent pick-up tubing for dispensing into a reservoir or reaction vessel. Check that spigot is in the Off position.



18L Poly-Lined Can



High-Flow Pressure-Transfer Procedures - 18L Poly-Lined Cans (continued)

Step 9.

Connect ¼ in. i.d. flexible gas line tubing to the hose barb on the top cap. **CAUTION! Do not clamp or wire the gas line tubing to the hose barb.** The hose barb allows the gas tubing to safely pop off in the event of excessive over-pressure during transfer. Connect the other end of the gas line tubing to a pressure-regulated (2-4psi) nitrogen supply.

Step 10.

Check that all cap connections are hand tight. Teflon® tape may be used to seal NPT threads if necessary.

Step 11.

Slowly turn on nitrogen supply to pressurize the container. **Note:** Open the On/Off spigot slightly to allow trapped gas in the tubing to escape, then open spigot fully to dispense solvent. The built-in pressure-relief valve will automatically vent if gas pressure exceeds 10psi. This is normal and prevents the buildup of unsafe pressures inside container. Adjust nitrogen supply to a lower pressure (2 to 4psi) and continue transfer.

Step 12.

When the solvent transfer is complete, turn off spigot and nitrogen gas. Open spigot to allow remaining solvent in the pick-up tubing to drain. Turn spigot off. Disconnect gas line tubing from cap. Carefully remove cap assembly from the can and place into a fume hood to dry. Avoid solvent contact with skin or breathing vapors when handling the cap assembly and tubing.

Step 13.

Replace the 2in. plug into the inner poly container and tighten with a plug wrench. Remove the metal one-hole cover and install the protective metal shipping cover on the can.

Step 14.

Discard the empty can or use for the collection of waste solvents. The economy VerSA-Flow cap, Z52,902-8, is well suited for waste solvent collection from instruments or reaction vessels.

High-Flow Pressure-Transfer Procedures - 20L, 25L Steel Cans and 50L, 100L, and 200L Poly-Lined Drums

CAUTION! Due to the hazardous nature of many chemicals packaged in Aldrich steel cans and drums, the user must exercise caution to prevent inhalation of chemical vapors or direct contact with skin during system set up and transfer. During pressure-transfer procedures it is recommended that operators wear appropriate personal protective equipment such as chemically-resistant gloves, goggles, splash apron, full face shield plus any additional protective equipment as required. See the Equipment section of the Aldrich Handbook for a complete listing of these items. The operator should be a fully qualified and experienced laboratory or chemical technician or production worker.

20L, 25L STEEL CANS AND 50L, 100L, AND 200L POLY-LINED DRUMS

Step 1.

Place the container in a secure and upright position in a safe and well ventilated area. If the product is to be delivered by weight, secure the container on an appropriate scale.

Step 2.

Remove the 2in.plug from the container with a plug wrench and set aside for re-use after transfer.

Step 3.

Separate the top cap from the lower cap by turning the center nut counterclockwise. Observe the Viton® O-ring within the lower part of the cap assembly and use care to ensure that it remains in position during the next step.

Step 4.

Install the lower cap in the container opening by carefully turning cap clockwise, then tighten securely by hand. Make sure that the cap is threaded into container opening properly to avoid cross-threading (damaging) the container threads. If container thread damage is suspected due to cross-threading, remove the cap and wrap the threads of the lower cap with several turns of Teflon® tape, then reinstall as above.

Step 5.

Adjust the depth of the FEP solvent pick-up tubing by loosening the compression fitting on the top cap and pushing the tubing to a length that just reaches the bottom of the container. Hand tighten the compression fitting to secure the tubing position. Carefully lower the solvent pick-up tubing into the container and install top cap into lower cap (installed in Step 4) by turning the center nut on the top cap clockwise, then tighten center nut securely by hand. Use care during installation of top cap to prevent cross-threading.

Step 6.

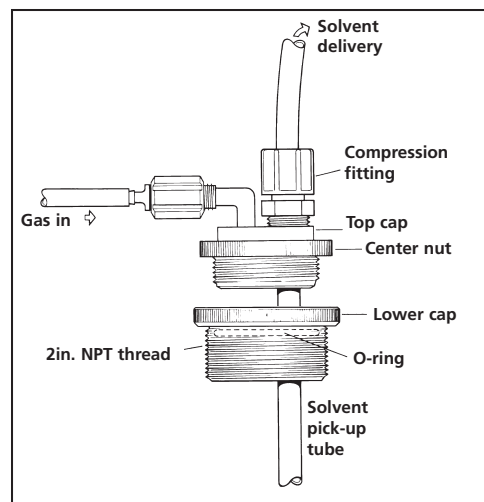
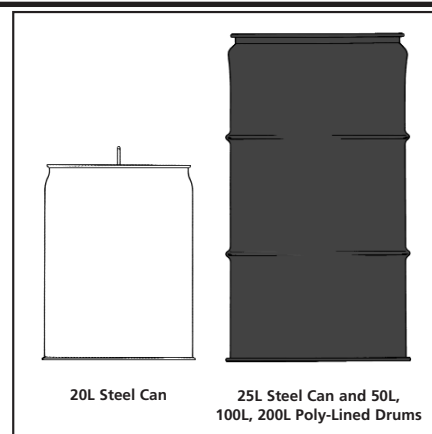
An On/Off spigot is attached to the end of the pick-up tubing for dispensing into a reservoir or reaction vessel. Check that spigot is in the Off position.

Step 7.

Connect ¼ in. i.d. flexible gas line tubing to the hose barb on the top cap. **CAUTION! Do not clamp or wire the gas line tubing to the hose barb.** The hose barb allows the gas tubing to safely pop off in the event of excessive over-pressure during transfer. Connect the other end of the gas line tubing to a pressure-regulated (2-4psi) nitrogen supply.

Step 8.

Check that all cap connections are hand tight. Teflon® tape may be used to seal NPT threads if necessary.



High-Flow Pressure-Transfer Procedures - 20L, 25L Steel Cans and 50L, 100L, and 200L Poly-Lined Drums (continued)

Step 9.

Slowly turn on nitrogen supply to pressurize the container. **Note:** Open the On/Off spigot slightly to allow trapped gas in the tubing to escape, then open spigot fully to dispense solvent. The built-in pressure-relief valve will automatically vent if gas pressure exceeds 10psi. This is normal and prevents the buildup of unsafe pressures inside container. Adjust nitrogen supply to a lower pressure (2 to 4psi) and continue transfer.

Step 10.

When the solvent transfer is complete, turn off spigot and nitrogen gas. Open spigot to allow remaining solvent in the pick-up tubing to drain. Turn spigot off. Disconnect gas line tubing from cap. Carefully remove cap assembly from the container and place into a fume hood to dry. Avoid solvent contact with skin or breathing vapors when handling the cap assembly and tubing.

Step 11.

Replace the 2in. plug into the container and tighten with a plug wrench.

Step 12.

Discard the empty container or use for the collection of waste solvents. The economy VerSA-Flow cap, Z52,902-8, is well suited for waste solvent collection from instruments or reaction vessels.

INSTALLING A LIQUID-LEVEL INDICATOR

Liquid-level indicators are available as options for low-flow pressure-delivery caps for 18L poly-lined cans and 50L poly-lined drums. Please inquire about indicators for other container sizes.

Step 1.

The stainless steel pipe is installed in the threaded hole on the underside of the top cap. Remove the threaded plug for this hole on the top cap by turning the plug counterclockwise.

Step 2.

Separate the top cap from the lower cap by turning the center nut counterclockwise. Observe the Viton® O-ring within the lower part of the cap assembly and use care to ensure that it remains in position.

Step 3.

Move the stainless steel pipe upwards through the lower cap, then carefully push the loop of the level indicator wire up through the threaded hole in the top cap so that it extends above the cap.

Step 4.

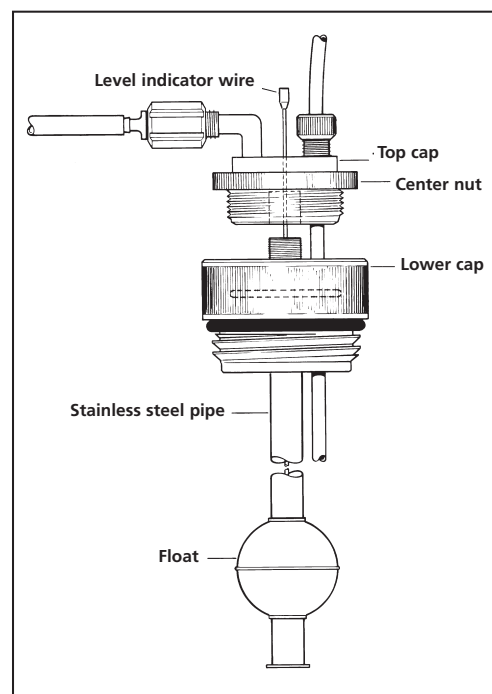
Carefully install the pipe into the threaded hole on the underside of the top cap by turning pipe clockwise until hand tight. **Note:** Check that pipe is vertically aligned in the threaded hole prior to turning. If pipe is misaligned during the turning process, cross-threading will occur and the pipe will not be straight in the cap.

Step 5.

Slide center nut upwards onto top cap, then slide the lower cap upwards to meet center nut. The assembly is now ready to install into container.

Step 6.

Go to STEP 4 of the LOW-FLOW PRESSURE-TRANSFER PROCEDURES to complete installation of the cap assembly.



READING THE LIQUID-LEVEL INDICATOR

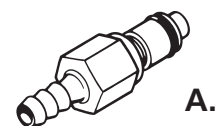
The liquid-level indicator consists of a 316 SS pipe with a float that is magnetically coupled to a color-coded wire that provides a visual indication of the liquid level in a container. The float drops with the liquid level in the container and pulls the color-coded wire along as it does so. The blue to yellow to red bands on the wire indicate the time to change out a container as they approach the top of the cap.

It is good practice to perform a manual check of the liquid level by lifting the wire upwards until it disconnects from the float, then lowering the wire until it reconnects. One can actually “feel” the connect or disconnect with the float through the wire. This practice ensures an accurate reading in the event the float becomes stuck or disconnects from the wire.

VERSA-FLOW ACCESSORIES

Automatic shut-off quick-disconnects

Well suited for gas line connections to VerSA-Flow caps. Fittings are spring-loaded, locking, and made of PP with 316 SS springs and EPR seals. When pulled apart, both sides seal quickly and automatically. For 1/4 in. i.d. flexible rubber and PVC tubing. Max. pressure: 90psi at 70°F. Working temp.: 32 to 230°F (air/water).



A.

Product Name	Bore (in.)	For tubing i.d. (in.)	Cat. No.
A. Coupling Insert	1/4	1/4 i.d., flexible	Z12,654-3
B. Coupling Body	1/4	1/4 in. NPTM thread	Z12,645-4

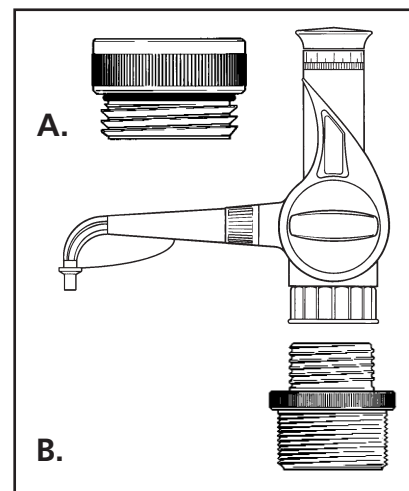


B.

Can and drum adapters

Adapters are precision machined PBT.

Adapter	Threads	Application	Cat. No.
A. Buttress	2in. NPT to buttress	Adapt NPT threads with 18L poly-lined steel cans	Z52,903-6
Buttress		Spare thread adapter, for cap Z54,381-0	Z54,386-1
B. Bottle-top	GL 32 to 2in. NPT	Mount Optifix® dispensers to Aldrich 20L steel cans	Z52,904-4
Bottle-top	GL 45 to 2in. NPT	Mount Ceramus® dispensers to Aldrich 20L steel cans	Z52,905-2

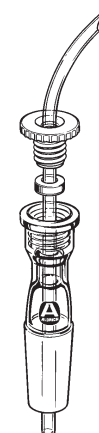


A.

B.

Torion™ tubing adapters

The Torion connection ensures an airtight seal between rigid wall transfer tubing and reaction vessel. For a complete listing of these adapters, see the Equipment section of the Aldrich Handbook or visit the Aldrich Glassware Catalog on-line at www.sigma-aldrich.com/glassware.



VerSA-Flow Accessories (continued)

Compression tubing fittings

Adapts rigid wall tubing of various sizes to VerSA-Flow caps. Fitting includes nut with ferrules and PBT bushing with ¼ in. NPTM thread.

For tubing o.d. (in.)	Cat. No.
1/8	Z54,385-3
3/16	Z54,458-2
1/4	Z51,437-3



VerSA-Flow threaded plug

Solid threaded plug, PBT, ¼ in. NPTM.

Z51,436-5



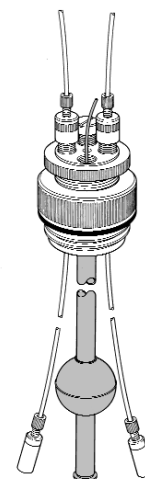
Liquid-level indicators

316 SS pipe and float with color-coded (blue-yellow-red) indicator wire for visual determination of liquid level inside of container.

For container

18L poly-lined steel can
50L poly-lined steel drum

Cat. No.
Z54,378-0
Z54,379-9



Sparge/solvent delivery assembly

2 micron SS filter, compression tube fitting and bushing with ¼ in. NPTM thread, 30in. x 1/8 in. o.d. FEP tubing. For direct dispensing of solvents from 18L poly-lined steel cans to HPLC instruments.

Z54,382-9



One-hole metal cover with locking ring

For 18L poly-lined steel cans.

Z55,319-0



Ground wires

Flexible wire prevents sparking of static electricity generated by the transfer of flammable liquids.

Description	Cat. No.
3ft L, w/2 copper alligator clips	Z19,786-6
3ft L, w/2 hand clamps	Z19,790-4
6ft L, w/2 copper alligator clips	Z15,030-4
10ft L, w/¼ in. terminal and hand clamp	Z19,791-2

On/Off spigot

Teflon® body, with compression fitting for ¼ in. o.d. rigid wall tubing. Z55,320-4

O-rings, Viton®

2in. Buttress thread O-ring Z55,327-1
 Inner O-ring for lower VerSA-Flow cap Z55,329-8

Plug wrench

For roundhead plugs only. 12in. L with offset handle. Non-sparking alloy. Z12,923-2

SNOOP® gas-leak detector

8oz bottle. Z27,391-0

Teflon® sealing tapes

Excellent for sealing NPT fittings. In 520in. rolls.

Width (in.)	Cat. No.
¼	Z14,881-4
½	Z10,438-8
1	Z22,188-0

Tubing

O.d. (in.)	I.d. (in.)	Cat. No.
Teflon® FEP rigid wall tubing		
⅛	¼	Z51,533-7
¼	⅜	Z28,023-2
¼	⅝	Z28,024-0

Latex rubber vacuum tubing

⅝	¼	Z25,585-8
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