Technical Bulletin

AtmosBag Inflatable Polyethylene Isolation Chambers

Store at Room Temperature

Introduction for Laboratory Use

AtmosBag is a flexible, inflatable, polyethylene Chamber with built-in gloves that lets you work in a totally isolated and controlled environment. It is an inexpensive, portable alternative to the glove box and is well suited to a variety of tasks and materials.

For field sampling

AtmosBag slips over the tops of cans and drums to blanket with inert gas and isolate vapors and dusts during sampling operations. Minimizes worker exposure and preserves the integrity of the sampled bulk material.

AtmosBag serves as a portable laboratory for conducting tests, crime scene investigations, and other applications where a clean isolated chamber is needed.

For emergency isolation

AtmosBag assists in preventing the gross contamination of a environment when inspecting or testing unknown or suspicious materials and for the temporary containment of leaking containers. Workers can quickly enclose, isolate, and seal a work area using AtmosBag.

2-Hand Front Entry Atmosbags

Description	Closure	Overall W x L (in.)	Approx. gas vol. (L)	Opening diam. (in.)	No. of ports	Cat. No.
Large, non-sterile	Tape	50 x57	520	34	5	Z106089**
Large, non-sterile	Zipper-lock	50 x57	520	34	5	Z530220
Large, Et_2O treated Fits 55-gal drum	Tape	51 x 58	520	36	4	Z118354
Medium, non-sterile	Zipper-lock	39 x 48	280	22.5	4	Z530212
Medium, non-sterile	Tape	39 x 48	280	22.5	4	Z112828
Medium, Et_2O treated	Tape	39 x 48	280	24	4	Z118362
Small. non-sterile	Tape	32 x 42	50	19.5	2	Z112836
Small, Et_2O treated	Tape	27 x 30	50	12	2	Z118370
Small. non-sterile	Zipper-lock	27 x 30	50	19.5	2	Z530204
Micro, non-sterile	Zipper-lock	23 x 34	~ 42.5	11	2	Z564397
Micro, non-sterile wide sleeve	Zipper-lock	32 x 34	~ 56.6	19.5	2	Z564400

**Fits 55-gal drum.

2-Hand Side Entry Atmosbag

Description	Closure	Overall W x L (in.)	Approx. gas vol. (L)	Opening diam. (in.)	No. of ports	Cat. No.
Small, ns, side entry	Zipper-lock	34 x 32	2.75ft^3	12	2	Z564435
Small, ns, dual side entry	Zipper-lock	34 x 32	2.75ft^3	12	2	Z564451
Mini, ns, side entry	Zipper-lock	24.38 x 32	1.75ft^3	12	2	Z564427
Mini, non-sterile, dual side entry	Zipper-lock	24.38 x 32	1.75ft^3	12	2	Z564443

4-Hand AtmosBags

Description	Closure	Overall W x L (in.)	Approx. gas vol. (L)	Opening diam. (in.)	No. of ports	Cat. No.
Large	Tape seal	44 x 57.5	500	29.5	5	Z108405
Large	Zipper-lock	45 x 58	500	29.5	5	Z555525

Applications

Anaerobic chamber

A continuous purge of dry inert gas prevents any traces on moisture or oxygen diffusion into AtmosBag.

Botany and Life Science

Create a controlled environment for growing plants or seedlings, for insect and pesticide studies, anesthesia studies, or use as an incubator for fetal studies and animal research.

Desiccating and constant-humidity chambers

Use as a low-humidity desiccator for storing glassware, reagents, or bulky items by inflating zipper lock AtmosBag with dry nitrogen and placing a container of desiccant inside to absorb traces of moisture that may diffuse into the bag. For high-humidity chambers, place a saturated solution of salt and water inside AtmosBag. To work with different relative humidities, use a constant purge technique with T-connectors to blend dry nitrogen gas with moisturized nitrogen gas (via water bubbler) into AtmosBag.

Dust-free environments

Inflate AtmosBag with filtered air or inert gas to perform delicate operations typical in the electronics and aerospace industries.

Emergency isolation

AtmosBag assists in preventing the gross contamination of an environment when inspecting unknown or suspicious materials and for the temporary containment of leaking or odoriferous containers. Workers can quickly enclose isolate and seal a work area using AtmosBag.

Environmental studies

AtmosBag can serve as a portable laboratory in the field, isolating and protecting samples and providing a clean environment for conducting tests and inspections.

Field sampling operations

Samples may be taken from containers in remote locations using AtmosBag. Place containers inside AtmosBag and seal. For large cans and drums, slip bag over the top and tape bag to the container. AtmosBag isolates vapors and dusts during the sampling process to minimize direct exposure.

Forensics

AtmosBag isolates crime scene evidence from contamination and permits inspection and manipulation without direct contact.

Manipulation of air- and moisture-sensitive materials

Operations such as material transfer and packaging, sampling, weighing, and even reactions can be conducted inside of AtmosBag under a blanket of dry inert gas such as nitrogen, argon, or helium to prevent decomposition.

Microscopy

Place a microscope inside AtmosBag and cut a port to accommodate the eyepiece, then seal with tape prior to purging.

Sample preparation in the lab

Place grinding equipment such as mixers, blenders, and mortars and pestles inside AtmosBag to protect samples from the atmosphere during preparation and to contain dusts and powdered materials from infiltrating the laboratory.

Weighing operations

Analytical and top-loading balances may be placed inside AtmosBag for weighing air- and moisture-sensitive materials and odoriferous materials.

AtmosBag permits weighing operations inside a fume hood for added safety. Air currents that would interfere with weighing are eliminated inside of AtmosBag.

Instructions For Laboratory Use

WARNING! When handling toxic materials use only in a fume hood or other controlled system to prevent and protect against exposure in case of leakage. When handling any hazardous material all proper personal protective equipment should be employed. See Sigma-Aldrich website for a complete listing of these items. AtmosBag will minimize the amount of possible contamination or exposure should a hazardous substance be released inside the bag.

Purge Gas Requirements

Inert gas applications

99.99+% pure nitrogen is an acceptable inert atmosphere for many applications. For more rigorous requirements, use a higher purity grade of nitrogen such as extra dry, prepurified, ultra-high purity, or oxygen free. The inert gas can also be passed through a Drierite gas-drying unit to remove trace amounts of water. (See the Accessories section in this bulletin.)

Other gas applications

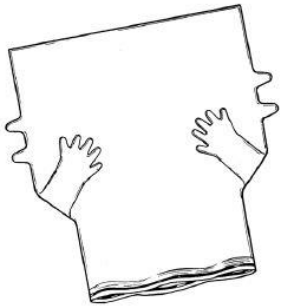
Dust-free filtered air, helium, oxygen, moisturized nitrogen, ordinary air, and carbon dioxide are examples of gases that may be used inside AtmosBag to suit particular experimental requirements.

Inflation pressure

Do not over inflate AtmosBag with gas as this will make insertion of hands into gloves difficult. TIP: Inflate AtmosBag like a very soft pillow.

Alternatively, a continuous gas purge may be employed by connecting AtmosBag to an oil bubbler as a pressure-relief device that maintains a constant pressure inside bag.

1. Select appropriate work area



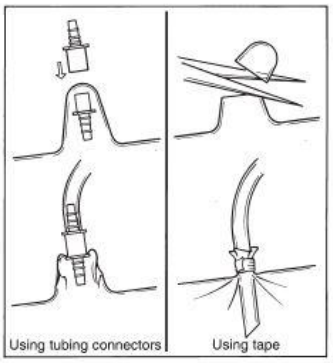
Unfold AtmosBag with open end towards you and place on a non-porous bench top or inside a fume hood when handling toxic materials to prevent and protect against exposure resulting from leakage. Check operation of Zipper-lock (if equipped) to ensure that track opens and closes properly.
Note: Zipper-lock track can distort if creased or folded excessively making closure of the bag difficult. Track distortion will usually self-correct if Zipper-lock is closed and allowed to remain flat for a period of time.

2. Stabilize AtmosBag

It is safe practice to stabilize AtmosBag to prevent movement during operations. Portable lattice supports and flat polyethylene bases are listed in the Accessories section for this purpose. Alternatively, double sided tape can be used to secure AtmosBag to non-porous bench tops.

Note: Use tape sparingly as it may be difficult to remove adhesive from bag and from bench top.

3. Connect purge gas, vacuum, and power lines



Inlet ports are located on each side of the bag for these connections. PE connectors are available for making gas and vacuum connections with flexible tubing. Tape, wrap-it ties, or rubber bands are used to seal tubing connections on AtmosBags.

Note: A 3-way stopcock may be installed at the bag inlet to control both vacuum and purge gas from a single point. An oil bubbler may be installed at an inlet for continuous purge operation.

Installing tubing connectors for AtmosBags

1. Snip end of inlet port with scissors to make a very small opening.
2. Separate two-piece tubing connector. Position one end inside of port inlet and the other outside of inlet.
3. Push connector pieces together firmly.
4. Connect AtmosBag to purge gas source and to aspirator or house vacuum with flexible tubing.

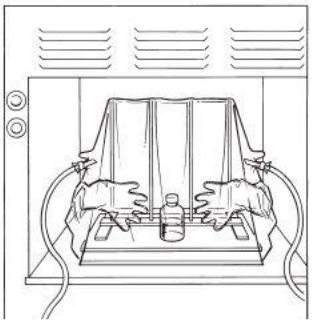
Installing tubing for AtmosBags

5. Snip end of bag inlet with scissors to make a small opening.
6. Insert flexible tubing and secure to inlet with tape, wrap-it tie, or rubber band.
7. Connect AtmosBag to purge gas source and to aspirator or house vacuum.

Installing power lines for all AtmosBags

1. Snip end of bag inlet with scissors to make a small opening.
2. Place anti-static device, balance, microscope or other electrical device inside AtmosBag and push plug and power line out of inlet. Secure line to inlet with tape, wrap-it tie, or rubber band.

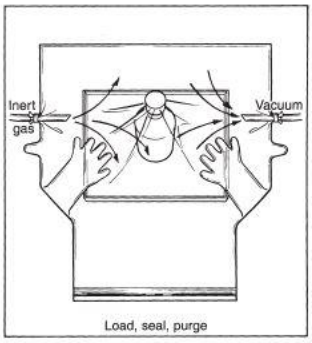
4. Load AtmosBag



Turn on purge gas and allow gas to gently flow out of front opening during loading. Place all necessary equipment inside of AtmosBag including items such as samples, sampling and transfer equipment, wipers, antistatic products, over-gloves, etc. Empty bottles can be purged with gas prior to loading to save time. The illustration shows AtmosBag inside a fume hood with optional stabilizing PE base and a portable lattice support for clamping bottles and apparatus.

5. Purge AtmosBag

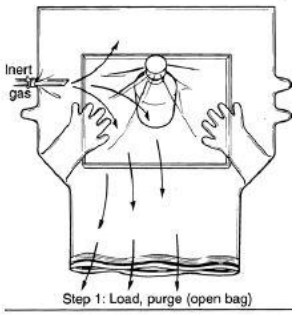
Vacuum/inert gas



For work with air- and moisture-sensitive materials, a series of 3 to 5 vacuum/inert gas purge cycles is recommended.

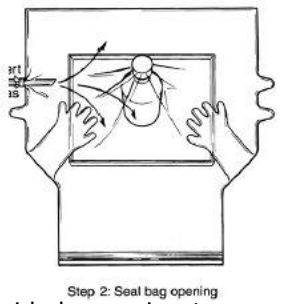
1. Seal open end of AtmosBag. For Zipper-lock bags, slide track closed, then fold end over two times* and clip. For Tape-seal bags, seal opening with strip of removable tape by folding it along the length of the opening. Fold taped end over two times* and clip.
2. Evacuate bag, then turn off vacuum.
3. Inflate bag, then turn off inert gas. Do not over inflate. Repeat evacuation/inflation cycle 3 to 5 times, finally inflating bag with inert gas to a very soft pillow level that allows easy insertion of hands. Turn off inert gas.
   Note: A 3-way stopcock may be installed at the bag inlet to control both vacuum and inert purge gas from a single point.
4. Observe that bag maintains inflation pressure over several minutes, then go to Insert hands into AtmosBag step. If bag deflates, correct leakage and repeat steps b. and c. until inflation pressure is maintained.

Inert gas only



When a source of vacuum is unavailable, use the following procedure to purge AtmosBag Step 5a with inert gas.

1. Seal open end of AtmosBag. For Zipper-lock bags, slide track closed. For Tape-seal bags, seal opening with strip of removable tape by folding it along the length of the opening.
2. Inflate bag, then turn off inert gas.
3. Open end of bag slightly to allow gas to escape. Deflate AtmosBag by pushing down on bag with hands to force gas out. Seal open end of AtmosBag. Repeat inflation/deflation cycle 3 to 5 times, finally inflating bag with inert gas to a very soft pillow level that allows easy insertion of hands. Turn off inert gas.
4. Fold end over two times* and clip.
5. Observe that bag maintains inflation pressure over several minutes, then go to Insert hands into AtmosBag. If bag deflates, correct leakage and repeat steps b., c., and d. until inflation pressure is maintained.



Continuous

1. To prevent the diffusion of air into AtmosBag over long periods of use, a continuous inert gas purge may be used.
2. Seal open end of AtmosBag. For Zipper-lock bags, slide track closed, then fold end over two times* and clip. For Tape-seal bags, seal opening with strip of removable tape by folding it along the length of the opening. Fold end over two times* and clip.
3. Select an inlet to connect AtmosBag to an oil bubbler to maintain a constant pressure inside bag as inert gas flows continuously during use.
4. Turn on inert gas to inflate AtmosBag, then adjust to a very low flow rate to maintain pressure.

* Folding end of AtmosBag over two times and securing with clips prevents accidental opening due to sudden excessive pressure situations or over inflation.

Other gas applications

A variety of gases such as dust-free filtered air, helium, oxygen, moisturized nitrogen, ordinary air, and carbon dioxide may be used to purge AtmosBag. Modify the purge procedures above to suit experimental requirements.

6. Insert hands into AtmosBag

Don a pair of cotton glove liners prior to insertion of hands. These liners absorb moisture and permit easy removal of hands from the bag. Chemically resistant "over-gloves" may be worn inside AtmosBag for extra protection when handling corrosive or toxic materials. For extra dexterity, don a pair of disposable nitrile gloves inside AtmosBag.

Note: Be sure to place over-gloves inside AtmosBag prior to purging. See the Accessories section for a listing of gloves.

7. Storage and disposal

Clean AtmosBags may be evacuated and folded flat for storage. Use care not to crease or damage Zipper-locks. Dispose of contaminated bags as required.

Instructions For Field Sampling

WARNING: User should be aware of hazards that may be present when sampling materials in the field or in remote locations. The material safety data sheet (SDS) for a material that is to be sampled must be read and understood by the user prior to use of AtmosBag.

When handling toxic materials use only in a fume hood or other controlled system to prevent and protect against exposure in case of leakage. When handling any hazardous material all proper personal protective equipment should be employed. See the Sigma-Aldrich web site for a complete listing of these items. AtmosBag will minimize the amount of possible contamination or exposure should a hazardous substance be released inside the bag.

Purge gas requirements

Inert gas applications

99.99+% pure nitrogen is an acceptable inert atmosphere for many applications.

1. Select an AtmosBag that fits the container to be sampled.
2. Minimize headspace inside AtmosBag. Roll the top of AtmosBag down and clip to eliminate extra headspace while allowing sufficient room to work. This step can significantly reduce the amount of purge gas required.
3. Use nitrogen to blanket the container in a single purge. Materials that are extremely air- or moisture-sensitive should be sampled in a laboratory using the vacuum/inert gas purge cycle procedures described in the section Instructions for Laboratory Use.

Other gas applications

There are a number of ways to inflate AtmosBag when a dry, inert atmosphere is not required. A portable auto mobile tire inflator will provide an air environment. A handful of dry ice chips placed inside a sealed AtmosBag will inflate the bag with carbon dioxide**.**

Inflation pressure

Do not over inflate AtmosBag with gas as this will make insertion of hands into gloves difficult.
Tip: Inflate AtmosBag like a very soft pillow.

Tips for field use

Sampling techniques for containers

Place containers inside AtmosBag and seal or slip bag over the top of large cans and drums and tape bag to the container to seal. Blanket with inert gas. The integrity of the sampled bulk material is thus maintained. AtmosBag isolates vapors and dusts during the sampling process to minimize direct exposure.

Portable laboratory use

Use AtmosBag as a portable laboratory in the field, isolating and protecting samples or evidence and providing a clean environment for conducting tests and inspections. Use a portable lattice system inside AtmosBag to stabilize bag during operations as well as support the bag when inflation is not required.

1. Select appropriate work area

Choose a well-ventilated area to perform sampling operations or perform work outside. Unfold AtmosBag with open end towards you and place on a flat, level surface. Check operation of Zipper-lock (if equipped) to ensure that track opens and closes properly. Note: Zipper-lock track can distort if creased or folded excessively making closure of the bag difficult. Track distortion will usually self-correct if Zipper-lock is closed and allowed to remain flat for a period of time.

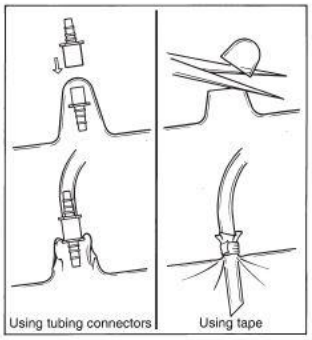
2. Stabilize AtmosBag

It is safe practice to stabilize AtmosBag to prevent movement during operations. Portable lattice supports and flat polyethylene bases are listed in the Accessories section for this purpose. Alternatively, double-sided tape can be used to secure AtmosBag to non-porous surfaces.

Note: Use tape sparingly as it may be difficult to remove adhesive from bag and from bench top.

3. Connect purge gas

Inlets are located on each side of the bag for these connections. PE connectors are available for making gas connections with flexible tubing. Tape, wrap-it ties, or rubber bands are used to seal tubing connections on Tape-seal AtmosBags.



Installing tubing connectors for Zipper-lock AtmosBags

1. Snip end of bag inlet with scissors to make a very small opening.
2. Separate two-piece tubing connector. Position one end inside of bag inlet and the other outside of bag inlet.
3. Push connector pieces together firmly.
4. Connect AtmosBag to purge gas source with flexible tubing.

Installing tubing for tape-seal AtmosBags

1. Snip end of bag inlet with scissors to make a small opening.
2. Insert flexible tubing and secure to inlet with tape, wrap-it tie, or rubber band.
3. Connect AtmosBag to purge gas source

Installing power lines for all AtmosBags

1. Snip end of bag inlet with scissors to make a small opening.
2. Place electrical device inside AtmosBag and push plug and power line out of inlet. Secure line to inlet with tape, wrap-it tie, or rubber band.

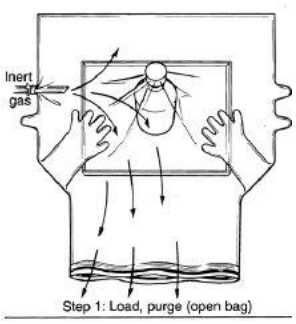
4. Load AtmosBag

Place all necessary equipment inside of AtmosBag including containers to be sampled, sampling and transfer equipment, tools, wipers, antistatic products, over-gloves, etc.

For cans and drums that don’t fit inside AtmosBag: Loosen drum plug with a wrench or remove cover of open head drums first, place sampling equipment on or inside container, then slip AtmosBag over top of container and tape to container to seal. Picture at right shows a medium size Tape-seal AtmosBag on a 50 L drum.

5. Purge AtmosBag: Inert gas

1. Seal open end of AtmosBag. For Zipper-lock bags, slide track closed, then fold end over two times* and clip. For Tape-seal bags, seal opening with strip of removable tape by folding it along the length of the opening. Fold taped end over two times* and clips. Follow sealing procedure for large cans and drums described in
2. Inflate bag to a very soft pillow level that allows easy insertion of hands, then turn off inert gas. Do not over inflate.
3. Observe that bag maintains inflation pressure over several minutes, then go to. If bag deflates, correct leakage, repeat steps a. and b. until inflation pressure is maintained.



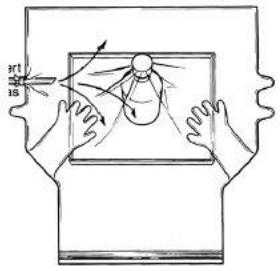
Step 1: Load, purge (open bag)

* Folding end of AtmosBag over two times and securing with clips prevents accidental opening due to sudden excessive pressure situations or over inflation.

OR

5. Inflate AtmosBag: Other applications

There are a number of ways to inflate AtmosBag when a dry, inert atmosphere is not required. A portable automobile tire inflator will provide an air environment. A handful of dry ice chips placed inside a sealed AtmosBag will inflate the bag with carbon dioxide. Work can be performed inside AtmosBag without gas inflation if desired. The use of a portable lattice system inside AtmosBag provides bag support and room to work.


Step 2: Seal bag opening

6. Insert hands into AtmosBag

Don a pair of cotton glove liners prior to insertion of hands. These liners absorb moisture and permit easy removal of hands from the bag. Chemically resistant "over-gloves" may be worn inside AtmosBag for extra protection. For extra dexterity, don a pair of disposable nitrile gloves inside AtmosBag.

Note: Be sure to place over-gloves inside AtmosBag prior to purging. See the Accessories section for a listing of gloves.

7. Storage and disposal

Clean AtmosBags may be evacuated and folded flat for storage. Use care not to crease or damage Zipper-locks. Dispose of contaminated bags as required.

Instructions For Emergency Isolation – Zipper-Lock Bags

WARNING: Use of this product is not intended to replace applicable safety policies or practices. AtmosBag is not fire-retardant or intended for prolonged contact with solvents, vapors, or chemicals. For single use only. Please dispose of used bag properly.

1. Unfold AtmosBag and spread out with open end toward you.
2. Place suspect item inside bag and close Zipper-lock.
3. Contact appropriate personnel.

AtmosBag Accessories

Anti-static equipment

Anti-static Ionizer

Place inside AtmosBag and turn on to eliminate static charges within 36 in. of unit. Excellent when working with electrostatic powders. Virtually maintenance-free. Compact 4.25 x 2.5 x 5in. footprint. UL and CE compliant.

AC volts	Cat. No.
120 US plug	Z563064
220-240 Schuko plug	PL800ASSPIEU
220-240 UK plug	PL800ASSPIUK

Zerostat®

Squeeze the trigger to neutralize static charge on sample vials, spatulas, and weighing equipment. Non-radioactive and does not require electrical power supply or batteries. Cat. No. Z108812.

Cotton Glove Liners

Lightweight 100% cotton, form fitting, disposable style. Ambidextrous. Each packages contains 12 pair. 8 in. L.

Size	Cat. No.
S/M	Z118338
M/L	Z118346

Gas Equipment

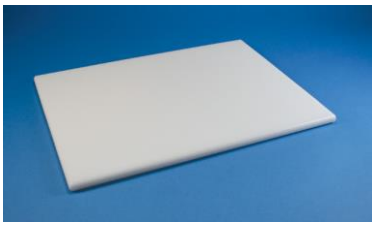
Drierite gas drying unit

Ensures thorough drying of inert purge gases for work with moisture-sensitive materials. Molded-acrylic column (2 5/8 o.d. x 11 3/8 in. H) filled with 1 lb of 8 mesh indicating Drierite. Water-vapor capacity: 50g. Safe for working pressures up to 90 psig. Flow rate should be 200 L/h or 0.1 scfm for maximum efficiency. Regenerate by heating granules on a tray for 1 hour at 200 °C**.** Cat. No. Z112879.

Stabilizing Bases and Supports

Polyethylene stabilizing bases

Rigid thick white polyethylene base keeps AtmosBag in place and provides a chemically resistant work surface. Size in table corresponds to AtmosBag size.



Size	Dim. (in.)	Cat. No.
S	11 x 16	Z112860
M	20 x 16	Z112852
L	24 x 34 ½	Z106917

Portable lattice system

System fits inside medium and large size AtmosBags to provide stable support for clamping equipment and to support bag when inflation gas is not required. Solid 5/8 in. diam. aluminum lattice rod sections, 11 3/4 in. L, screw into each other for extra height. Nonslip rubber feet on base. Cat. No. Z225657.

Polypropylene tape

Excellent for sealing custom cut openings in AtmosBag and for sealing AtmosBag to the outside of drums during sampling. 3 in. x 60 yd. roll. Cat. No. Z106925.

Tubing, Connectors, and Valves

PVC purge tubing

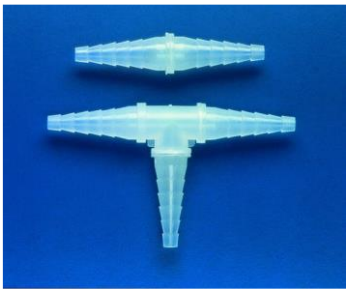
¼ i.d. x 3/8 in. o.d. x 100 ft. Cat. No. Z280372.

Tubing quick-disconnects

Consists of two serrated connectors which are joined securely through a male-female center taper. Connector of one size can be interchanged with other sizes to produce reducing combinations. PE.

Tubing i.d. (in.)	Cat. No.
1/8 – ¼	Z104485
¼ - 3/8	Z104353
3/8 - ½	Z104361

Tubing connectors



The “five-in-one” fits 5 sizes of tubing and will connect the same size tubing on both ends or act as a reducer for any combination within the range. The inside diameter increases with notch size when unneeded length is cut off for unrestricted flow. The molded PP connectors are steam autoclavable at 121 °C (250 °F). Ring diam.: 9/16, 1/2, 7/16, 3/8 and 5/16 in.

Description	Cat. No.
Straight, 90 mm L	Z178470
“T”, 118 x 67 mm	Z178489

Nalgene® stopcocks

PP with ® TFE plug. Serrated tubulation on each end. For use with ¼ to 5/16 in. i.d. tubing. Autoclavable. (Nalgene® 6460).

Bore (mm)	Cat. No.
2	Z286435
4	Z286443

Nalgene® 3-way stopcocks

PP with TFE plug. Serrated tubulations arranged in a T-shape. For use with ¼ to 5/16 in. i.d. tubing. Autoclavable. (Nalgene® 6470).

Bore (mm)	Cat. No.
2	Z286451
4	Z286478

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