

NOWPak[®] Liner-Based Canister System

User manual



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SECTION 1: OVERVIEW

This user guide is intended for use by personnel who will install, use, maintain and repair the NOWPak® liner-based canister system. General and descriptive information about the system is provided. Step-by-step instructions for all user procedures and troubleshooting information are included in this guide.

Chemical Suppliers will use the instructions in this guide to refurbish the canisters, and for filling new and refurbished canisters with chemicals for use by and end users of the system.

End Users of the system will use the instructions in this guide to install dispense connectors and canisters to their production tools, operate the system, change out empty canisters, and maintain the canister components.

The contents of this guide have been organized into the following sections to assist you in locating the information you need. Contents of the manual are subject to change without notice.

SAFETY INFORMATION

This section provides important safety information that must be understood and followed by anyone working with the NOWPak liner-based canister system.

SYSTEM INFORMATION

This section provides general information about the system.

CANISTER SYSTEM COMPONENTS

This section contains descriptions of, and usage information for, system components.

HANDLING THE CANISTER

This section contains information about handling and moving canisters that are filled with chemicals. Instructions are provided for properly storing filled canisters and staging canisters before dispensing chemicals from them.

REFURBISHING AND REFILLING THE CANISTER

This section is for use by chemical suppliers who fill new canisters with chemicals and who receive empty canisters from end users for refurbishment and refilling. Step-by-step procedures are provided for the disassembly, cleaning, recycling, and refilling operations performed by chemical suppliers.

ADDITIONAL GUIDES

Additional Entegris guides are available upon request and provide descriptions and operating instructions for the dispense connectors used in the liner-based canister system.

SECTION 2: SAFETY

These safety instructions must be followed whenever installing, removing, filling, operating, or working on or around the NOWPak liner-based canister system.

GENERAL SAFETY PRECAUTIONS

- Follow all appropriate chemical safety regulations.
- Wear chemical splash goggles and other appropriate Personal Protection Equipment (PPE) when handling components containing chemicals.
- Only dispense hazardous chemicals in a highly ventilated area to avoid exposure to hazardous chemical vapors.
- Observe all instructions and warnings on the NOWPak liner-based canister.
- Always dispense liquids away from the operator, or any other person.
- Regularly inspect the dispense connector for evidence of chemical leaks.
- If a leak is observed, stop operation, and repair the leak.
- Use only Entegris original parts for repair or maintenance.
- Use only Entegris recommended tools for setup, operation, and maintenance of the liner-based canister system.

- A three-way valve must be installed in the inert gas supply line to allow for safe canister pressurization and depressurization.
- Filled canisters must be handled using appropriate canister handling equipment. Entegris recommends using a four-wheel drum dolly to move 200-liter canisters. Never roll a filled canister on the chime edge or on its side!

⚠ WARNING: 200-liter canisters must have internal pressure released before removing the dispense connector. If the canister is pressurized, the dispense connector may fly upward with great force while being removed. Serious injury or death may result.

⚠ WARNING: The maximum operating pressure is 101 kPa (14.7 psig) within the United States. Outside of the United States follow local regulations, which may require lower dispense pressure to be used. Use a pressure relief valve to prevent over pressurization of the canister. Dispense connectors with preset pressure relief valves are available.

IMPORTANT: The maximum internal canister pressure is 196 kPa (28.4 psig) for canisters larger than 40 liters. Do not allow the pressure inside any canister to exceed this rating.

TECHNICAL SUPPORT

For technical support, contact Entegris at +1 800 394 4084. Please have the complete model number, chemical, and application information ready when calling.

SECTION 3: SYSTEM INFORMATION

The liner-based canister system consists of a reusable stainless-steel outer shell and a single-use inner liner filled with a desired chemical. The canister is available in sizes from 4 to 200 liters and can be fitted with a variety of dispense connector types to suit your dispensing requirements.

In use, a dispense connector is installed on the canister, Figure 1, and connected to the end user's application. The inner liner collapses as the chemical is dispensed. When empty, the canister is ready to be refurbished with a new, pre cleaned liner and refilled with chemicals.

Replacement liners will safely contain the most hazardous chemical. Liners are available in fluoropolymer materials for highly aggressive chemical fills, or coextruded polyethylene materials for less aggressive applications that require ensured purity or gas barrier protection.



Figure 1. NOWPak liner-based canister system.

SECTION 4: CANISTER SYSTEM COMPONENTS

This section of the guide provides a description of the main components used in the NOWPak liner-based canister system.

A complete liner-based canister system, Figure 2, consists of a filled canister with an installed cleanroom-manufactured liner, diptube, retainer, and closure. At the point of use, the closure cap is removed and an Entegris chemical dispense connector is attached to the canister for chemical dispensing.



Figure 2. Stainless steel canister with installed components (cutaway view).

During chemical dispense, gas pressure from the user's system is applied through the dispense connector to the outside of the liner. The gas pressure squeezes the liner, forcing chemicals up through the diptube to the dispense connector. As the chemicals are dispensed, the liner collapses.

Once the canister is empty, the end user sends it back to the chemical supplier who removes the old liner, refurbishes, and refills the canister.

NOTE: See Appendix A: Required Tools, page 28, for descriptions and item numbers of specialized tools needed to handle canister system components and to refurbish empty canisters.

NOTE: See Appendix B: Canister Compatibility Matrix, page 32, for item numbers and descriptions of canister components, replacement parts, and for additional accessories that can be purchased for use with the canister system.

LINER-BASED CANISTERS

The stainless-steel canisters are available in the following sizes:

- 4-liters
- 10-liters
- 18-liters
- 19-liters
- 20-liters
- 40-liters
- 200-liters

NOTE: See Appendix B: Canister Compatibility Matrix, page 32, for canister model numbers and item numbers of the components to be used with each canister.

NOTE: Each canister size requires the use of a specific liner, diptube, and closure. All 4- to 40-liter canisters have a 2.5" diameter neck opening and 200-liter canisters have a 4.75" diameter neck opening. Some canister sizes have different thread sizes than others. Be sure to use the correct components for each canister size and type.

REPLACEMENT LINERS

The chemical inside the canister is contained within a pre cleaned, single-use, collapsible liner, Figure 3, which the chemical supplier installs and inflates inside the canister. The liner is sealed in the canister using a retainer and a closure.

Different liner materials are available for a wide range of chemicals and are available as particle certified. Particle certified liners are manufactured and packaged within a Class 5 cleanroom as per International Standard ISO 14644-1:1999 cleanrooms and associated controlled environments – Part 1: classification of air cleanliness. A certificate of analysis stating lot specific particle count data can be obtained from a web-based database.

Replacement liners for 200-liter canisters include the fitment adapter needed to reduce the fitment opening for diptube insertion. Each liner is pre folded and sealed within a plastic sleeve along with a retainer. The liners, retainers, and fitment adapters (200-liter only) are packaged in equal quantities.

Please contact Entegris for application-specific information and liner compatibility.

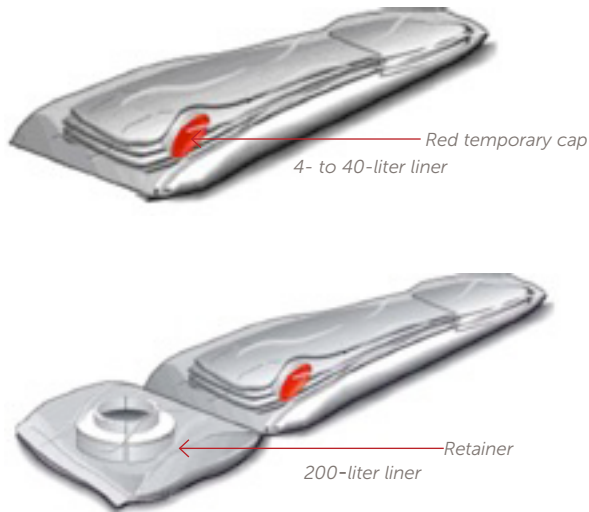


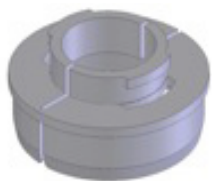
Figure 3. Replacement liners.

RETAINERS

The liner is inserted into a canister and held in place with a retainer, Figure 4. The two halves of the retainer close around the liner fitment, preventing the fitment from falling inside the canister. There are two different retainers: one for use with 4- to 40-liter canisters, and one for use with 200-liter canisters.

The appropriately sized retainer is packaged with each replacement liner. For 4- to 40-liter size liners, one retainer is included for each liner, and for 200-liter size liners, one retainer plus one fitment adapter is included for each liner.

Retainer for 4- to 40-liter liners



Retainer for 200-liter liner

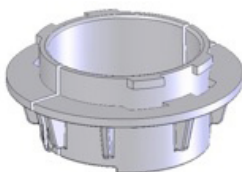


Figure 4. Retainers (one packaged with each replacement liner).

FITMENT ADAPTERS

200-liter canisters require a fitment adapter, Figure 5, to be inserted inside the retainer. The fitment adapter reduces the larger 200-liter fitment opening to the size needed for diptube insertion. The 4- to 40-liter canisters do not use a fitment adapter.

One fitment adapter is packaged with each 200-liter replacement liner.

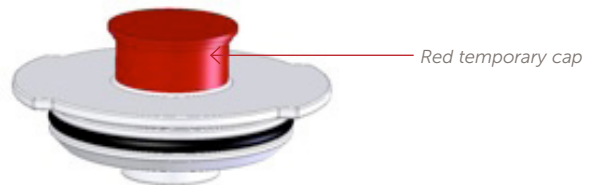


Figure 5. Fitment adapter.

DIPTUBE

Before sealing a filled canister, the chemical supplier inserts the diptube, Figure 6, into the canister. Diptubes for the liner-based canister system are available with different downtube lengths, and each diptube corresponds with a specific canister size.

At the end user site, the dispense connector is installed and chemical is forced up through the diptube and dispensed through the dispense connector to the end user's production tool.

NOTE: See Appendix B: Canister Compatibility Matrix, page 32, for information about the correct diptube to use with each canister and for optional O-ring materials.



Figure 6. Diptube.

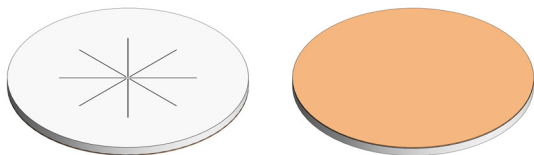
REPLACEMENT BREAKSEALS

Breakseal technology, Figure 7, separates the chemical from the environment to ensure absolute chemical integrity during transport of filled canisters. When the dispense connector is inserted into a canister at the end user's site, it punctures the breakseal and allows access to the chemical stored inside the liner.

Breakseals are single-use only. Each time a chemical supplier refurbishes a canister, a new breakseal is inserted into the closure base before capping the filled canister.

NOTE: All liner-based canister system canisters use a breakseal, except the 63 mm neck thread type canisters using the one-piece closure (item part number NC-W2). These require an ND-LD or ND-HR dispense connector to be attached directly to the canister after the closure has been removed. See ND-LD Dispense Connectors on page 9.

NA-09 standard breakseal



NA-49 standard breakseal

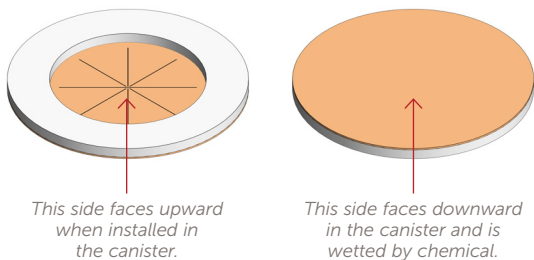


Figure 7. Replacement NA-09 and NA-49 standard breakseals shown.

CANISTER CLOSURES

The chemical supplier uses a closure to seal the canister after filling it with chemicals. At the end user's site, the closure cap is removed by hand and a dispense connector is installed for drawing chemical from the canister.

Canister closures are either two-piece assemblies or one-piece.

Two-Piece Closures

Most canisters are sealed using a two-piece closure, Figure 8. The closure base is torqued into place onto

the canister, and the closure cap is hand-tightened onto the base.

The following two-piece closures are available for use on liner-based canister system canisters, Figure 8:

- **NC-03:** anodized aluminum, 4- to 40-liter canisters, 2.5-12 UN neck thread, EPDM with PTFE coated O-ring
- **NC-03-2:** anodized aluminum, 4- to 40-liter canisters, 2.5-12 UN neck thread, FEP-encapsulated O-ring
- **NC-04:** anodized aluminum, 4- to 40-liter canisters, 63 mm buttress neck thread, EPDM with PTFE coated O-ring
- **NC-04-2:** anodized aluminum, 4- to 40-liter canisters, 63 mm buttress neck thread, FEP-encapsulated O-ring
- **NC-200-2:** anodized aluminum, 200-liter canisters, 4.75-4 buttress neck thread, FEP-encapsulated bottom O-ring
- **NC-200-4:** anodized aluminum, 200-liter canisters, 4.75-4 buttress neck thread, EPDM with PTFE coated bottom O-ring

Each two-piece closure includes a closure base that contains a compression ring and O-ring, and a closure cap that contains another O-ring. See Appendix B: Canister Compatibility Matrix, page 32, for information on the thread specifications for each type of closure base and cap.

NC-03/NC-04

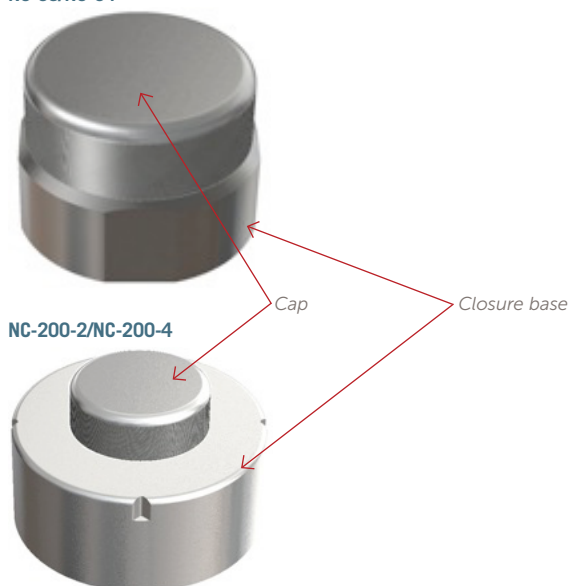


Figure 8. Two-piece anodized aluminum closures.

One-Piece Closure

The 63 mm neck thread canister type can use the one-piece closure, Figure 9, and then only when an ND-LD dispense connector is used. The 63 mm neck thread canister type allows the one-piece closure to be installed directly onto the canister.

At the end user's site, the one-piece closure is removed, and the ND-LD dispense connector is installed directly onto the canister neck. No breakseal is used in this arrangement. See ND-LD Dispense Connectors page 9.

NOTE: The 63 mm neck thread canister type can also use an NC-04 two-piece closure when an ND-CD dispense connector is used.



Figure 9. NC-W2 one-piece plastic closure.

CHEMICAL DISPENSE CONNECTORS

Three different types of chemical dispense connectors are available to meet specific dispense conditions. Refer to the NOWPak liner-based canister system data sheet or contact Entegris for application-specific information, options, and model numbers:

- ND-CD
- ND-LD
- ND-ED (MaxMT™ system)

Refer to the relevant Entegris user guide or data sheet for specifications and for detailed user and maintenance instructions for each type of dispense connector.

ND-CD Dispense Connectors

The ND-CD series pressure dispense connector, Figure 10, provides a clean, convenient, and completely sealed method for dispensing chemicals from liner-based canister system containers. ND-CD dispense connectors have all fluoropolymer wetted surfaces and require the use of a two-piece closure. (When installed on a canister, the dispense connector threads onto the closure base.)

ND-CD dispense connectors can be used with any size canister (4- to 200-liters), however, some ND-CD models have longer threaded collars, and other models have shorter threaded collars. Collar length affects which dispense connectors are accepted by each canister. See Appendix B: Canister Compatibility Matrix, page 32, for information on matching ND-CD dispense connectors with appropriate canisters and components.

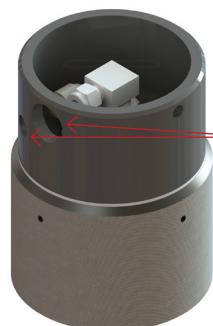
See the *ND-CD Connector Series Operating and Maintenance Procedures Guide* for detailed user information on these dispense connectors.

ND-CD-SA Type (Slotted)



Slot in the upper connector body for the tubing to pass through.

ND-CD-SB Type (Strain Relief)



Holes in the upper connector body for the tubing to pass through. These holes prevent the fitting from being turned by the tubing.

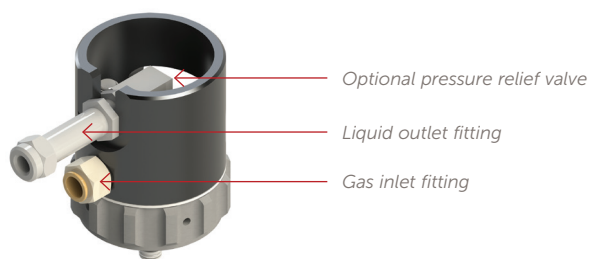
ND-CD-XC Type

Figure 10. ND-CD dispense connectors.

ND-LD Dispense Connectors

The one-piece ND-LD dispense connectors, Figure 11, are available for use only with 20-liter canisters. The ND-LD dispense connector has a different thread size and a built-in diptube and is used only on canisters that have been sealed with the one-piece plastic closure.

See Appendix B: Canister Compatibility Matrix, page 32, for information on matching ND-LD dispense connectors with appropriate Liner-based canisters and components.

The ND-LD series connectors have an FEP/PFA/PTFE fluid path. The diptube can be removed easily and changed, if necessary. A nitrogen or helium source is necessary to pressurize in between the liner and overpack to dispense chemical from the canister.

At the end user's site, the one-piece closure (NC-W2) is removed from the canister, exposing the chemical. The ND-LD dispense connector is then connected directly to the canister neck threads with no breakseal being used.

Refer to the ND-LD data sheets or contact Entegris for model numbers and detailed user information on these dispense connectors.



Figure 11. ND-LD dispense connector.

ND-ED MaxMT Dispense System

The MaxMT dispense system connectors, Figure 12, combine pressure dispense and integrated empty detection to maximize chemical utilization. The MaxMT system uses dispense pressure to detect when one canister is empty and automatically switches dispense to the second canister.

MaxMT dispense system connectors are used with 10- to 40-liter liner-based canisters. See Appendix B: Canister Compatibility Matrix, page 32, for more information. A complete MaxMT system comprises two MaxMT system connectors and a control box used with liner-based canisters, diptubes, closures, and liners.

Refer to the MaxMT system, data sheets or contact Entegris for model numbers and detailed user information on these dispense connectors.



Figure 12. ND-ED MaxMT dispense connectors (installed on 19-liter canisters) and control box.

SECTION 5: HANDLING THE CANISTERS

Use the information in this section of the guide for handling, storing, and staging liner-based canister system canisters. Chemical suppliers and end users must follow proper procedures for handling and moving canisters.

MOVING THE CANISTERS

Due to the size and volume of the 40- to 200-liter canister, it is recommended that a four-wheel drum dolly be used to move the filled containers. Other methods may be suitable but should be tested on a container filled with water before being used on a canister that contains chemical.

- ⚠ WARNING: Never roll a filled canister on the chime edge or on its side! Canisters must not be dropped. These actions could cause the canister to crack or suffer other structural failure.**
- ⚠ WARNING: Larger canisters, such as 40- to 200-liter, are very heavy and should only be moved by trained personnel using properly rated moving equipment. Improperly lifting or moving canisters can cause damage, including breakage of the canister or serious injury.**
- ⚠ WARNING: Under no circumstances should a filled canister be transported without the mechanical aids described above.**

STORING AND STAGING THE CANISTERS

Canisters filled with chemical must be stored under proper conditions, as determined by the type of chemicals involved. At the end use site, filled canisters must be staged before being used to dispense chemical, as required by the type and amount of chemical used.

Storing Filled Canisters

Storage conditions vary by chemical contained in the canister. Contact the chemical supplier for appropriate storage for each chemical.

Staging Filled Canisters

The time required for the chemical in a canister to reach thermal equilibrium is determined by the properties of the contained chemical and the staging conditions.

Please contact the chemical supplier for appropriate staging times for each chemical.

SECTION 6: REFURBISHING AND FILLING THE CANISTERS

The procedures in this section of the guide are performed by chemical suppliers when an empty canister is received from an end user and when filling a refurbished or new liner-based canister.

Refurbishing and filling a liner-based canister consists of the following procedures:

- Empty canister disassembly and liner removal
- Inserting a liner into the canister
- Inflating a liner using a bag inflation fixture (BIF)
- Inflating a liner using a manual inflation fixture
- Filling a canister with chemical and inserting the diptube
- Capping the canister
- Shipping the canister

IMPORTANT: The chemical supplier must ensure the correct components are used for each canister refurbished. See Appendix B: Canister Compatibility Matrix, page 32, to find the liners, diptubes, adapters, and closures to be used with each canister.

EMPTY CANISTER DISASSEMBLY AND LINER REMOVAL

Use this procedure to remove the diptube and liner from an empty canister and dispose of the liner properly. This is typically the first process performed on a canister that has been received for refurbishing.

Items needed:

- Liner disposal plug: part number NA-07 (for 40- to 200-liter canisters); part number DA-03 (for 200-liter canister).
- Appropriate handling supplies for the used liner and diptube. Some chemical will remain on these when they are removed from the canister. Entegris recommends placing the used diptube into a sealable bag.

⚠ WARNING: Some chemical may remain on component parts. Follow all chemical safety procedures and wear chemical splash goggles and other appropriate PPE.

1. Remove the entire closure assembly using the appropriate torque adapter tool and torque wrench, Figure 14.

Inspect and clean the closure and replace the breakseal before using the closure again. See Closure Maintenance on page 23.



Figure 14. Removing the closure (19-liter canister shown).

2. Remove the diptube using one of the diptube removal tools (part number NA-13), Figure 15.
3. This step does not apply to a 20-liter canister with NC-W2 closure. In this configuration, the diptube was removed by the end user along with the dispense connector.
 - If using the NA-13 tool, insert the tool into the coupler and tilt at an angle to the side. Lift straight up to extract the diptube from the retainer.



Figure 15. NA-13 diptube removal tool.

4. (200-liter canister only) Remove the fitment adapter from inside the canister neck, Figure 4, page 6. Use either of these methods:

- Manual: Pull up on the edges of the adapter to disengage the O-ring or use the liner removal tool.
- Liner removal tool (part number DA-04): Place the bottom opening of the tool over the top of the adapter and turn clockwise until it stops. While holding the liner with one hand, pull up on the liner removal tool with the other hand until the O-ring is disengaged from the liner fitment.

5. Drain any residual chemical from the canister before removing the liner from the canister.

6. Remove the liner from the canister. The liner should be fully collapsed before performing this step, Figure 16.

- Place the liner removal tool over the top of the fitment.
- Rotate the liner removal tool 90° until it stops.
- With one hand, pull up on the liner removal tool while the other hand guides the liner out of the canister. Use a gentle, side-to-side motion to prevent tearing of the liner during removal.
- When the liner is completely removed from the canister, disconnect the liner removal tool from the retainer.
- Install the appropriate liner disposal plug (part number NA-07 for 4- to 40-liter canisters) in the liner fitment. Make sure the disposal plug is firmly seated.
- Consolidate used liners, then dispose of the liners in an appropriate manner based on the chemical in the liner.

⚠ WARNING: Used liners may contain small amounts of chemical vapor. Proper ventilation and safety equipment are required for liner removal. Dispose of used liners in accordance with local laws and regulations for contaminated waste.

IMPORTANT: If the liner tears during removal, and chemical spills inside the canister, the canister interior must be thoroughly cleaned before being recycled or reused.

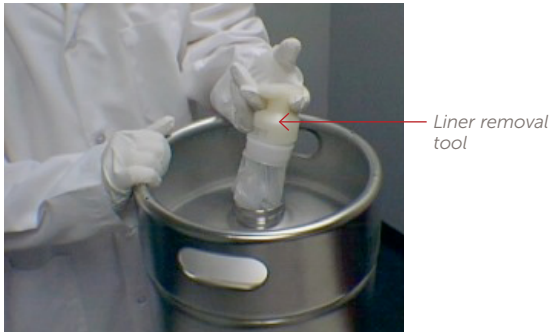


Figure 16. Removing the used liner.

NOTE: If the reusable diptube is inside the liner, cut the liner and remove the diptube. The diptube can now be inspected and cleaned for reuse, see Diptube Maintenance on page 21.

- Inspect the canister carefully before reusing it, following your internal procedures. It is the chemical supplier's responsibility to ensure that the canister is not damaged and is suitable for use before filling with chemical.

NOTE: Cleaning the canister interior is not required unless the liner integrity has been compromised. Entegris does not prescribe cleaning procedures for reusable components, and cleaning procedures depend on the specific chemical properties of the chemical in question. However, deionized water/isopropyl alcohol mixtures are commonly used for cleaning, which is generally followed by a deionized water rinse.

INSERTING TWO-DIMENSIONAL REPLACEMENT LINERS INTO THE CANISTER

Use this procedure to insert a replacement liner into a canister before inflating and filling with chemical.

Tools required, (see Required Tools on page 28):
 Liner insertion tool, part number NA-60 (4- to 40-liter canisters); part number NA-60-200 (for 200-liter canisters).

Items needed: New pre folded liner with included retainer (for all liners) and fitment adapter (for 200-liter only).

IMPORTANT: Each liner is pre folded to ensure proper inflation when an automatic or manual inflation fixture is used. The folds are designed to open in a determined order, allowing the liner to conform to the interior of the canister and attain maximum volume. Do not unfold the liner before inserting it into the canister.

- Select a new, properly sized, pre folded liner.

NOTE: See Appendix B: Canister Compatibility Matrix, page 32, to find the liners that may be used with each canister.

- Place the correct liner insertion tool into the canister neck, Figure 17. The liner insertion tool is used to prevent damage to the replacement liner as it is inserted into the canister through the neck opening. This insertion tool protects the liner from any burrs or defects inside the canister neck.



Figure 17. Liner insertion tool inserted in canister neck (NA-60 shown).

- Remove the new liner from the cleanroom packaging. Do not unfold the liner. The folds in the liner are specifically designed to enable proper inflation of the liner. The folds create a small amount of back pressure which allows the bag to form to the upper and lower portions of the canister equally.

For 40-liter and 200-liter liners the bottom of the liner is folded up. Remove this fold prior to inserting into canister. Be careful to prevent damaging the liner while handling it.

- Insert the liner into the canister until about 1/3 of the liner remains outside the canister, Figure 18.



Figure 18. Liner being inserted into canister (observe liner folds).

NOTE: Be sure the liner is not rotated or becomes twisted as it is inserted into the canister. Those conditions can result in improper inflation.

- Grasp the liner layers in the front and back of the liner and pull gently to separate the layers. This creates an open path for the gas to flow through during the initial stage of inflation, Figure 19.



Figure 19. Separating the liner layers.

- Tuck the top corners of the liner into the canister with the liner insertion tool still residing in the neck of the canister, Figure 20.



Figure 20. Tucking in the liner layers.

- Remove the liner insertion tool while holding on to the top of the fitment.

NOTE: Do not allow the liner fitment to drop through the neck of the canister.

- Place the retainer (packaged with the liner) around the fitment. Be sure to examine the base of the fitment and remove any portion of the liner that may be hooked on the upper fitment, Figure 21.

All liner material should be below the base of the fitment.

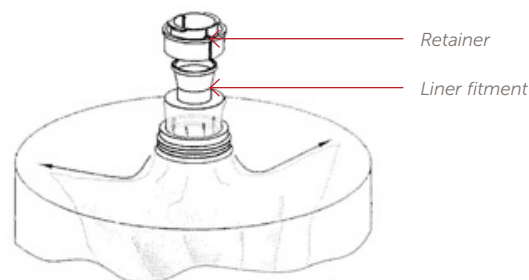


Figure 21. Placing the retainer around the fitment (200-liter canister shown).

- Seat the fitment and retainer into the neck of the canister, Figure 22.



Figure 22. Seating the fitment and retainer into the canister.

- The canister is now ready for inflation.

INSERTING THREE-DIMENSIONAL CONFORMAL LINERS INTO THE CANISTER

Use this procedure to insert a replacement liner into a canister before inflating and filling with chemical.

Tools required, (see Required Tools on page 28):
Liner insertion tool, part number NA-60 (for 19 - to 40-liter canisters); part number NA-60-200 (for 200-liter canisters).

Items needed: New pre folded liner with included retainer (for all liners) and fitment adapter (for 200-liter canisters only).

IMPORTANT: Each liner is pre folded to ensure proper inflation when an automatic or manual inflation fixture is used. The folds are designed to open in a determined order, allowing the liner to conform to the interior of the canister and attain maximum volume. Do not unfold the liner before inserting it into the canister.

1. Select a new, properly sized, pre folded liner.

NOTE: See Appendix B: Canister Compatibility Matrix, page 32, to find the liners that may be used with each canister.

2. Place the correct liner insertion tool into the canister neck, Figure 23. The liner insertion tool is used to prevent damage to the replacement liner as it is inserted into the canister through the neck opening. This insertion tool protects the liner from any burrs or defects inside the canister neck.

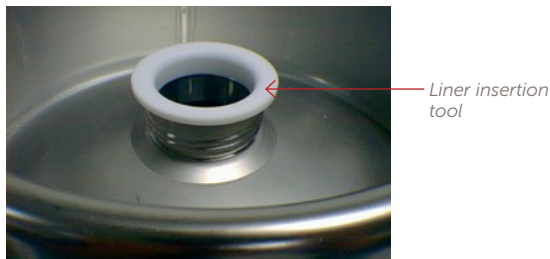


Figure 23. Liner insertion tool inserted in canister neck (NA-60 shown).

3. Remove the new liner from the cleanroom packaging. **Do not fully unfold the liner.** The folds in the liner are specifically designed to enable proper inflation of the liner. The folds create a small amount of back pressure which allows the bag to form to the upper and lower portions of the canister equally.

Be careful to prevent damaging the liner while handling it.

For 40-liter and 200-liter liners the bottom of the liner is folded up. Remove this fold prior to inserting into canister.

4. Insert the liner into the canister until the fitment remains outside the canister, Figure 24.



Figure 24. Liner being inserted into canister (observe liner folds).

NOTE: Be sure the liner is not rotated or becomes twisted as it is inserted into the canister. Those conditions can result in improper inflation.

5. Remove the liner insertion tool while holding on to the top of the fitment.

NOTE: Do not allow the liner fitment to drop through the neck of the canister.

6. Place the retainer (packaged with the liner) around the fitment. Be sure to examine the base of the fitment and remove any portion of the liner that may be hooked on the upper fitment, Figure 25.

All liner material should be below the base of the fitment.

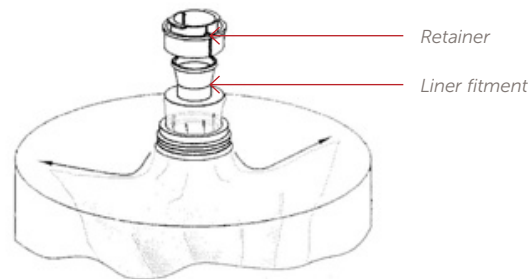


Figure 25. Placing the retainer around the fitment (200-liter canister shown).

7. Seat the fitment and retainer into the neck of the canister, Figure 26.



Figure 26. Seating the fitment and retainer into the canister.

8. The canister is now ready for inflation.

INFLATING A LINER INSIDE A CANISTER

After inserting a liner into a canister, the chemical supplier inflates the liner prior to chemical filling. Proper inflation ensures maximum volume of the system.

Liners may be inflated using either a bag inflation fixture (BIF) or a manual inflation fixture. A BIF provides fast and automated inflation and is generally used for high volume customers. Manual inflation takes longer but is suitable when fewer canisters are being refurbished.

Using a Bag Inflation Fixture (BIF)

The BIF is used to inflate a liner inside a canister, Figure 27. Chemical suppliers typically use a BIF when they frequently refurbish canisters because the BIF provides fast and automatic inflation. Low volume operations may choose to use a manual inflation fixture instead.

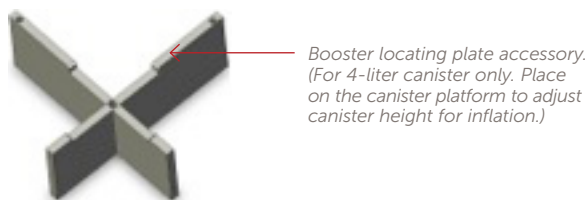
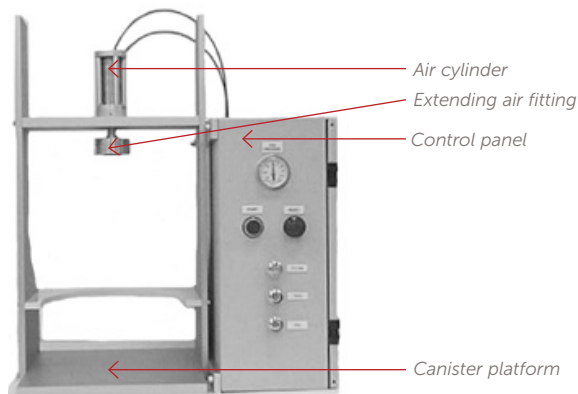


Figure 27. Bag inflation fixture (NF-01-FR shown).

NOTE: The use of bag inflation fixtures not manufactured by or approved by Entegris may cause inflation problems. Entegris is not responsible for inflation problems that result from the use of an unapproved bag inflation fixture.

Tools Required (see Required Tools, page 28)

Tool	PART NUMBER		
	4- to 20-liter canister	40-liter canister	200-liter canister
Automated bag inflation fixture (BIF)	NF-01-FR	NF-40-FR	NF-180/200-FR
Booster locating plate (for 4-liter only)	NA-107	–	–
Locating plate (for 10- and 18-liter only)	NA-135	–	–

NOTE: See the appropriate Entegris bag insertion fixture User Guide for detailed instructions on using the bag inflation fixture.

To use a BIF, first set up the BIF as described in the appropriate User Guide. Place the canister with installed liner on the canister platform and initiate the automatic inflation process. The air cylinder will extend the air fitting over the canister neck and inflate the liner.

When inflation is complete, a green PASS light will glow. The fixture will automatically exhaust the canister pressure and the air cylinder will retract. The liner is now inflated, and the canister may be filled with chemical.

Manual Liner Inflation Fixture

Follow this procedure to use a manual inflation fixture to inflate a liner that has been installed in a canister. This procedure requires the user to manually control the flow of inflation gas into the liner and monitor the inflation process.

Tools Required (see Required Tools, page 28)

Tool	Canister neck thread type	Item number
Manual Inflation Fixture	2.5-12 UN thread	NA-41-8990
	Modified buttress 63 mm thread	NA-41
	Buttress 4.75-4 thread (200-liter)	NA-41-200-2

	NF-01-FR	NF-40-FR	NF-180/200-FR
Canister size	4-, 10-, 18-, 19-, 20-liter	40-liter	200-liter
Liner type	All	All	All
Fill timer (no units)	3.5	3.5	3.5
Test timer (no units)	1	1	1
Exhaust timer (no units)	2.5	2.5	3.25
N ₂ switch	62.0 ±1.7 kPa (9.00 ±0.25 psig)	62.0 ±1.7 kPa (9.00 ±0.25 psig)	62.0 ±1.7 kPa (9.00 ±0.25 psig)
N ₂ regulator	82.7 ±6.9 kPa (12.00 ±1.00 psig)	82.7 ±6.9 kPa (12.00 ±1.00 psig)	165.5 ±6.9 kPa (24.00 ±1.00 psig)
CDA regulator	276 – 483 kPa (40 – 70 psig)	276 – 483 kPa (40 – 70 psig)	345 – 483 kPa (50 – 70 psig)
Flow rate at fill head	≥75 L/min	≥170 L/min	≥270 L/min
Equipment cycle time (reference): fill test exhaust	4-liter 15 – 20 sec 10-liter 20 – 25 sec 18-, 19-, 20-liter 30 – 35 sec	60 sec	120 sec
No load set up reading (reference): N ₂ regulator gauge	35 – 55 kPa (5 – 8 psig)	35 – 55 kPa (5 – 8 psig)	35 – 55 kPa (5 – 8 psig)
No load set up reading (reference): control panel gauge	14 – 21 kPa (2 – 3 psig)	N/A	N/A

Table 1

1. Connect the proper manual inflation fixture to a filtered and regulated nitrogen source, Figure 28.
2. Verify the three-way valve is closed.
3. Set the pressure regulator inlet to 586 kPa (85 psig).
4. Set the pressure regulator outlet to the desired outlet pressure, Table 1, and allow the system to stabilize. The exact set point may vary depending on source pressure, line size and length.

NOTE: Outlet pressure from the regulator must be at least 6 kPa (9 psig). Increasing the outlet pressure causes the liner to inflate more quickly; however, increasing the pressure beyond the recommended setting, Table 1, may damage the liner during inflation and should be avoided.

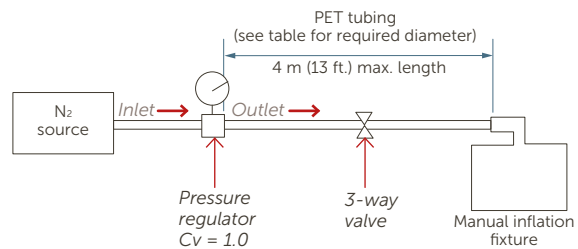


Figure 28. Connecting the manual inflation fixture (typical setup).

NOTE: Ensure a filter is installed on the gas pressure source to prevent contamination of the liner.

The use of any manual inflation fixture not manufactured by or approved by Entegris may cause inflation problems that result from the use of an unapproved manual inflation fixture.

5. (200-liter canister only.) Place a fitment adapter into the 2 inch liner fitment, Figure 29.
6. Connect the manual inflation fixture to a canister with a properly inserted liner by threading clockwise until firm resistance is felt.



Figure 29. Fitment adapter.

7. Open the three-way valve to begin the flow of nitrogen into the liner.
8. Monitor the pressure reading on the regulator to verify that the pressure drops below 62 kPa (9 psig). If the pressure does not drop below 62 kPa (9 psig), the inflation process should be stopped, and the regulator setting should be reduced prior to inflating liners.
9. Close the three-way valve when the pressure rises back up to 62 kPa (9 psig) on the pressure regulator. This stops the inflation with an internal pressure of 62 kPa (9 psig).
10. Allow the system to stabilize for 20 seconds. During this time the regulator pressure will move up to the original set point. This time is required to allow the liner to properly form to the interior of the canister.
11. Release pressure to the canister by switching the three-way valve to the vent position.
12. Remove the manual inflation fixture from the canister and remove the fitment adapter (200-liter only). Inspect the canister interior for visible obstructions through the fill opening. If no obstructions are noted, remove the fitment adapter (when used) and replace the red temporary cap on the fitment or seal with a suitable closure.
13. The canister is now ready to be filled with chemical. If an obstruction is noted, the liner may be re-inflated a second time as described above. If obstructions persist, the liner should be removed and replaced.

NOTE: Removing a previously inflated liner from the canister may damage the liner and may compromise its performance.

NOTE: If the canister is not going to be filled immediately, secure the red temporary cap to the canister to prevent contamination.

If the liner does not inflate properly, check the following troubleshooting tips:

SYMPTOM	CAUSE	CORRECTIVE ACTION
No flow or restricted flow of nitrogen or CDA	Regulator improperly installed or damaged	Verify regulator and filter plumbing.
Total inflation time is too long	Nitrogen pressure too low	Check the inlet regulator pressure setting. Make sure the tubing is large enough and is not too long.

CANISTER FILLING AND DIPTUBE INSERTION

Chemical suppliers use this procedure to fill a canister with the desired chemical, after the liner has been inserted and inflated.

1. Remove the red temporary cap or closure assembly from the canister, if present.
2. Fill the liner with the desired chemical in accordance with internal operating procedures and regulations. See Appendix B: Canister Compatibility Matrix, page 32, for fill capacity information.

NOTE: Do not attempt to fill chemical through the diptube. Insert the diptube after filling the canister, as described below.

3. (200-liter canister only) Upon completion of chemical filling, remove the red protective cap from the proper fitment adapter. Insert the adapter into the fitment and press firmly to ensure the adapter is fully seated in the fitment. The fitment adapter, Figure 29, is used on all 200-liter canisters to reduce the fitment opening to the size required for diptube insertion.

4. Insert a pre cleaned diptube through the center of the fitment or adapter. Leave the diptube resting loosely in the fitment or adapter. Do not press the diptube down into the liner fitment. A seal of the diptube to the fitment is not required, nor desired, for pressure equalization purposes.

⚠ WARNING: Pressing the diptube into the liner fitment creates a safety hazard.

NOTE: New diptube assemblies from Entegris are pre cleaned and ready for use. No further cleaning is required prior to the initial use.

5. The filled canister is ready to be capped, Figure 30.



Figure 30. Installed diptube.

CAPPING A FILLED CANISTER

After filling a canister, the chemical supplier uses a closure to cap the canister and make it ready for shipping. Most canisters use a two-piece aluminum closure with breakseal. Only the 20-liter canister uses the one-piece closure, and only when used with an ND-LD dispense connector. Follow the appropriate procedure, below.

IMPORTANT: It is the chemical supplier's responsibility to use the correct closure for the canister being capped. Do not overtighten. If the closure or canister threads are damaged or cross-threaded, liquid dispense may be affected. See page 19 for recommended torque values.

Two-Piece Closures

Use this procedure to cap a filled canister with a two-piece closure.

Tools Required (see Required Tools, page 28)

Tool	PART NUMBER	
	4- to 40-liter canister	200-liter canister
Torque wrench	NA-18	NA-92
Torque adapter tool	NA-10	DA-06
Breakseal insertion tool	NA-23	NA-23

Items needed:

One breakseal for each two-piece closure. See Two-Piece Closure Replacement Parts, page 23, for ordering information.

1. Inspect the closure, Figure 31, to ensure that both pieces are clean and that no parts are worn out or damaged. See Closure Maintenance on page 23 for cleaning and replacement procedures.
 - a. Verify the compression ring is in place in the closure base.
 - b. Verify that the appropriate O-rings are in place to ensure a proper seal.
 - c. Verify that the cap O-ring is not excessively worn.

NOTE: New closure assemblies purchased from Entegris can be used "as is" due to cleanroom manufacturing. No further cleaning is required prior to use.

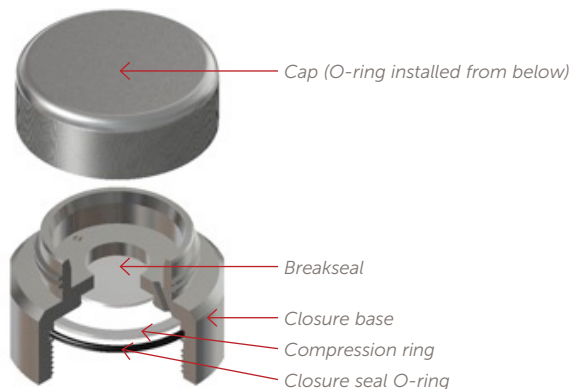


Figure 31. Two-piece closure (4- to 40-liter closure shown).

2. Install a new breakseal into the closure base, Figure 32.
 - a. Place the closure base upside down on an appropriate work surface.
 - b. Insert a new breakseal into the closure base, gasket side down.
 - c. Press the breakseal into place using the breakseal insertion tool (NA-23).

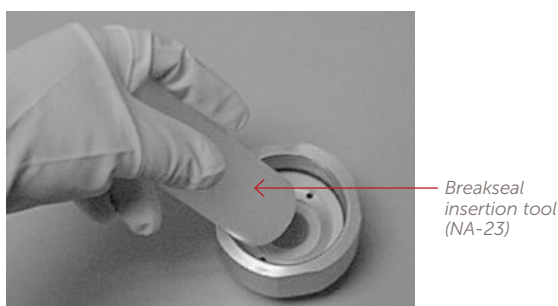


Figure 32. Installing a breakseal.

NOTE: The breakseal membranes have been critically cleaned and should not be exposed to an uncontrolled environment. To maintain cleanliness all assembly operations must be performed within a cleanroom environment.

3. Assemble the closure cap onto the base.
4. Place the assembled closure onto the canister neck. Torque the closure clockwise onto the canister to the specified value using the appropriate torque wrench and adapter, Figure 33.

Closure number	Closure base torque
NC-03/NC-03-2 NC-04/NC-04-2	27 – 34 N•m (20 – 25 ft•lbs)
NC-W2	9.0 – 9.6 N•m (80 – 85 in•lbs)
NC-200-2/NC-200-4	47 – 54 N•m (35 – 40 ft•lbs)

NOTE: If proper torque is not applied, the closure base could come loose when the dispense connector is removed, causing serious damage to the dispense connector.

5. Hand tighten the closure cap. There is no need to torque the cap.
6. The canister is now ready to ship.

IMPORTANT: Ensure the closure cap is tight before shipping a canister filled with chemical. Do not drop filled canister or place filled canisters on their side. Both actions can cause damage to the liners and the breakseal.



Figure 33. Installing and tightening the two-piece closure.

One-Piece Closures

Use this procedure to cap a filled canister with a one-piece closure. The one-piece closures (NC-W1 and NC-W2) are used when an ND-LD dispense connector is used to dispense chemical from the canister.

NOTE: 20-liter canisters can also be capped with a two-piece closure when an ND-CD or MaxMT dispense connector will be used with the canister. See Two-Piece Closures, page 7.

Tools Required for Torquing the NC-W2 Closure

Tool	Part number
Torque wrench	NA-33
Torque adapter tool	NA-03

1. Inspect the closure, Figure 34, to ensure it is clean and not worn out or damaged. See Closure Maintenance, page 23, for cleaning and replacement procedures.



Figure 34. One-piece polypropylene closure (NC-W2).

- Place the closure directly onto the canister neck. Torque the closure clockwise onto the canister to the specified value using the appropriate torque wrench and adapter.

Closure	Canister size	Closure base torque
NC-W2	20-liter	9.0-9.6 N•m (80-85 in•lbs)

- The canister is now ready to ship.

CANISTER ASSEMBLY OVERVIEW

The following illustrations show the diptube and closure components used to cap a liner-based canister that is filled with chemical:

- 19-liter canister with NC-03 closure, Figure 35
- 20-liter canister with NC-W2 closure, Figure 36
- 200-liter canister with NC-200-2 closure and standard fitment adapter, Figure 37



Figure 35. 19-liter with NC-03 closure.



Figure 36. 20-liter with NC-W2 closure.

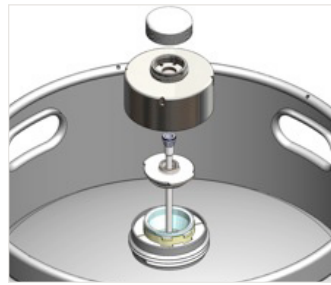


Figure 37. 200-liter with NC-200-2 closure and fitment adapter.

CANISTER SHIPMENT

Use this information to prepare a set of filled and capped canisters for shipment to a customer.

⚠ WARNING: 200-liter canisters are very heavy and should only be moved by trained personnel using proper equipment. See Moving the Canisters, page 10, for instructions and mandatory safety procedures.

NOTE: Ensure the cap on the top of the closure is tight before shipping a canister filled with chemical. Do not drop filled canisters or place filled canisters on their side. Both actions can cause damage to the liners and the breakseals.

- Palletize canisters with closures up.
- Do not ship canisters lying on side.
- Use slip-sheet between layers.
- Stacking two layers high is permissible for canisters smaller than 200-liters.
- Stretch wrap and band pallet for stability.

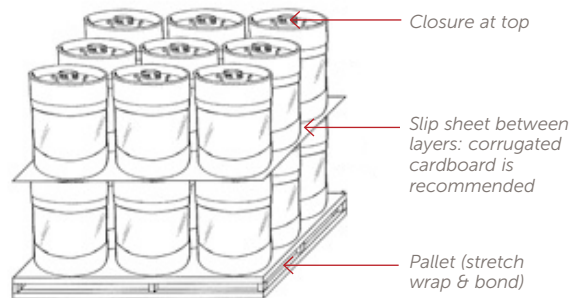


Figure 38. Canister palletized for shipping.

NOTE: End users should return empty canisters to the chemical supplier in a similar manner. Be sure to orient closures up to avoid leakage of any residual chemical into the area between the shipping cap and closure base.

SECTION 7: CANISTER SYSTEM MAINTENANCE

Chemical suppliers and end users of the liner-based canister system follow the procedures in this section to perform these cleaning and O-ring replacement procedures:

- Maintaining the diptube
- Maintaining the closure
- Maintaining the fitment adapter (200-liter canisters only)
- Maintaining the dispense connector

⚠ WARNING: Some chemical may remain on component parts. Follow all chemical safety procedures and wear chemical splash goggles and other appropriate personal protective equipment (PPE).

DIPTUBE MAINTENANCE

Standard FEP diptubes can be reused but must be thoroughly cleaned and inspected before each new use. Entegris is not responsible for damage resulting from using diptubes that have been improperly cleaned or are damaged or worn out. Such diptubes can cause dispense failure and must not be reused.

Normal diptube maintenance includes cleaning after each use and replacing the O-ring as needed. This is normally performed by the chemical supplier when refurbishing a canister, but end users may also perform diptube cleaning.

Single-use PE diptubes are meant to be replaced after each use.

Tools Required (see Required Tools, page 28): O-ring pick part number NA-27.

Items Needed: One O-ring for each diptube being maintained. See FEP Reusable Diptube Replacement O-ring Part Numbers, page 22, for ordering information and optional O-ring materials.

IMPORTANT: Entegris does not recommend disassembling the diptube, other than to replace the O-ring.

1. Slide the worn O-ring from the coupler using an O-ring pick or similar tool.
2. Clean the diptube assembly with an appropriate cleaning solvent.
3. Carefully inspect the old O-ring. If it shows any signs of wear or damage, discard and obtain a new O-ring.
4. Place one section of the O-ring into the groove and evenly pull the O-ring over the top of the coupling and into the remaining part of the groove, Figure 39.

NOTE: Do not roll or twist the O-ring as this may result in connection or dispense difficulties.



Figure 39. Removing the diptube O-ring.

NOTE: New diptube assemblies purchased from Entegris are pre cleaned in a cleanroom environment and do not require additional cleaning prior to use.

IMPORTANT: It is critical that the diptube O-ring be in good condition and is inserted properly in the diptube gland. Check to make sure there are no scratches or gouges in the O-ring gland area. Damage or improper installation could result in dispense failure at the end user site.

FEP Reusable Diptube – Replacement O-ring Part Numbers

DIPTUBE PART NUMBER	SIZE	O-RING PART NUMBER	O-RING MATERIAL
NDT-T4	4 L	NA-24 (Qty 50)	EPDM
NDT-T5	10 L	NA-24-1000 (Qty 1,000)	
NDT-T9	18 L		
NDT-T8	19 L		
NDT-T7	20 L		
NDT-T40	40 L		
NDT-T200-2-E	200 L		
NDT-T4-C	4 L	200995 (Qty 1)	Chemraz
NDT-T5-C	10 L		
NDT-T8-C	19 L		
NDT-T7-C	20 L		
NDT-T40-C	40 L		
NDT-T200-C	200 L		
NDT-T200-F	200 L	NA-131A-10 (Qty 10)	Semi-perfluoroelastomer
NDT-T200-2-F		NA-131A-500 (Qty 500)	

CLOSURE MAINTENANCE

Normal maintenance for two-piece closures consists of cleaning the closure cap and base and replacing O-rings and compression ring as needed, Figure 40.

The NC-W2 one-piece closure does not require any maintenance other than cleaning.

Inspect the O-rings and compression ring every time

a canister is changed out. The O-ring surface can deteriorate over time. If an O-ring appears worn or damaged, it should be replaced. The frequency of replacement depends on usage. Be sure to read the O-ring Handling Guidelines on page 25.

The following table indicates how often the two-piece closure components are typically replaced:

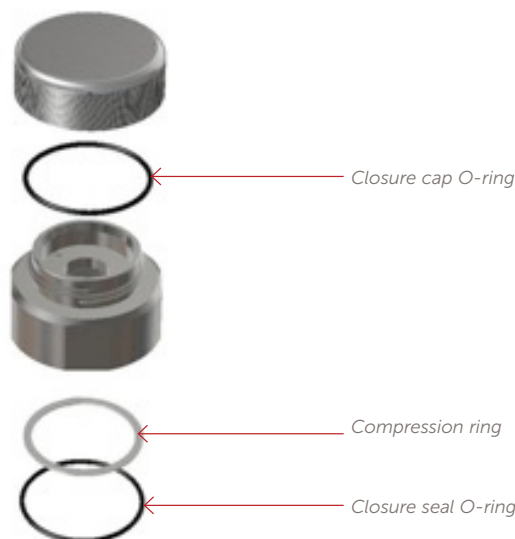
CLOSURE COMPONENT	CLOSURE PART NUMBER	CLOSURE O-RING PART NUMBER	MATERIAL	MEAN TIME BETWEEN REPLACEMENT (MTBR)
Closure cap O-ring	NC-03 NC-04 NC-200-2 NC-200-4	200328-C 200328-C-50 200328-C-500	EDPM with PTFE coating	6 months
	NC-03-2 NC-04-2	NA-133-T-10 NA-133-T-100	FEP-encapsulated silicone	2 uses (estimated)
Closure body O-ring	NC-03	200405-C 200405-C-100 200405-C-500	EDPM with PTFE coating	Each use
	NC-03-2	NA-133-T-10 NA-133-T-100	FEP-encapsulated silicone	2 uses (estimated)
	NC-04	200328-C 200328-C-50 200328-C-500	EPDM with PTFE coating	Each use
	NC-04-2	NA-133-B-10 NA-133-B-100	FEP-encapsulated silicone	2 uses (estimated)
	NC-200-2	201075-C	FEP-encapsulated silicone	25 uses (estimated)
	NC-200-4	201440-C 201440-C-50	EDPM	Each use
Compression ring	NC-03 NC-03-2	400321-C 400321-C-100 400321-C-500	HDPE	100 uses (estimated)
	NC-04 NC-04-2	NA-133-S-10 NA-133-S-100	HDPE	100 uses (estimated)
	NC-200-2 NC-200-4	401120-C	Polypropylene	100 uses (estimated)
Breakseal	NC-03 NC-03-2 NC-04 NC-04-2 NC-200-2 NC-200-4	NA-09 or NA-49	PTFE wetted surface	Each use

Tools Required (see Required Tools on page 28):
O-ring removal tool part number NA-27.

Items Needed: O-rings and compression ring for the closure being serviced. See closure component table, page 23, for ordering information.

1. Remove the cap from the closure base.
2. Unless the cap has been exposed to chemical, there is no need for additional cleaning or O-ring removal. Inspect the cap O-ring and replace if necessary.
 - a. Slide the worn O-ring from the cap using an O-ring pick or similar tool.
 - b. Install the replacement O-ring. Ensure that it is seated uniformly in the O-ring groove.
3. Remove the compression ring and O-ring from the bottom of the closure base, using an O-ring removal tool. The compression ring and FEP-encapsulated silicone O-ring can be cleaned and reused several times. The EPDM (or EPDM with PTFE coating) O-ring must be replaced with each closure use.
4. Clean the closure base, compression ring, and FEP-encapsulated silicone O-ring by using an appropriate solvent for the application.
5. Install closure seal O-ring and compression ring. Place the O-ring carefully in the O-ring gland, taking care to avoid twisting.
6. Install the compression ring by pressing it firmly into the closure base.
7. Blow off the closure assembly using filtered nitrogen to remove any surface contamination.

4- to 40-liter closures



200-liter closures

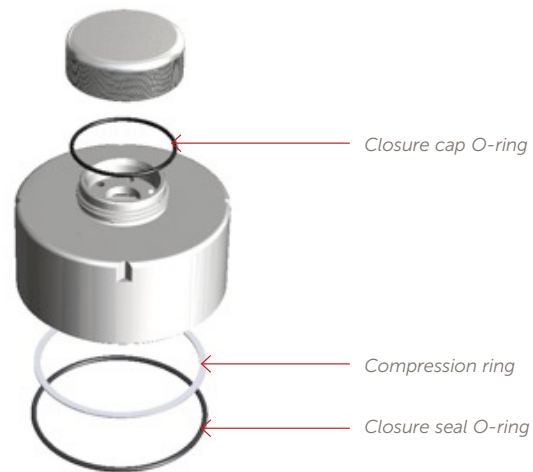


Figure 40. Two-piece closure components.

NOTE: Installing the O-ring first assists in the installation of the compression ring.

IMPORTANT: The closure seal O-ring provides a critical seal that enables the pressure dispense function of the dispense connector. EDPM material begins to deteriorate after its initial use. Therefore, to ensure seal performance during pressure dispense application, this O-ring must be replaced with each use of the closure.

DISPENSE CONNECTOR MAINTENANCE

Dispense connector maintenance includes cleaning and O-ring replacement. O-ring replacement is the major maintenance activity, Figure 41. On some dispense connectors the user may also replace the probe, liquid dispense fitting, and the gas inlet fitting.



Figure 41. Removing dispense connector O-rings (ND-CD shown).

NOTE: For maintenance procedures to be performed on the dispense connector, including O-ring replacement, refer to the Entegris user guide for the type of dispense connector being used (ND-CD, ND-LD, or MaxMT).

O-ring Handling Guidelines

Avoid twisting O-rings. Twisted or incorrectly installed O-rings will reduce the ability of the O-ring to form a seal between the dispense connector and the canister and may result in leaks or inability to dispense.

Use only tools specifically designed for O-ring handling. Entegris offers part number NA-27. O-ring handling tools must be polished and designed to prevent scratches.

When removing or replacing O-rings, minimize contact with the dispense connector probe and avoid scratching the O-ring grooves. Stretch the O-ring uniformly and as little as possible during installation. Confirm that the O-ring is completely inserted and uniform within the O-ring groove.

Entegris replacement O-rings have been pre cleaned. Additional cleaning is not necessary prior to use.

To ensure proper fit and operation, only Entegris replacement O-rings should be used. Entegris is not responsible for damage or failure to operate resulting from using third-party O-rings.

SECTION 8: USING THE CANISTER SYSTEM

This section of the guide describes procedures that end users follow when using the NOWPAK liner-based canister system to dispense chemical to their production tool(s).

NOTE: The information in this section of the guide provides a general overview of the procedures performed by end users of the liner-based canister system. Actual procedures vary depending on the type of dispense connector used. Refer to the appropriate Entegris user guide or data sheet for detailed user instructions.

Figure 42 shows a typical example of how liner-based canisters are connected to an end user's production tool. The actual connections and components vary, depending on the user's equipment and application, and on the type of dispense connector used. However, all systems provide inert gas pressure to the canister to dispense chemical from the canister to the production tool.

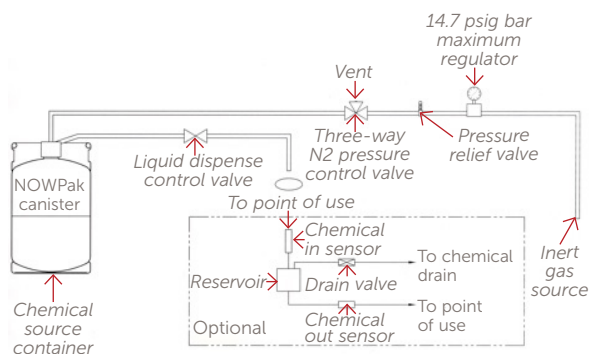


Figure 42. Typical pressure dispense chemical dispense installation.

END USER PROCEDURES

For the end user, normal canister system setup and operation includes the following procedures.

- Install a dispense connector to the production tool.
- Connect the dispense connector to a filled canister.
- Dispense chemical from the canister.
- Change out empty canisters.
- Troubleshoot chemical leaks.

Installing a Dispense Connector to the Production Tool

Before connecting a canister, the end user installs one of the three dispense connector types (ND-CD, ND-LD, or MaxMT) to their production tool. This procedure includes connecting the dispense connector to the tool's inert gas and chemical lines.

During dispense, the inert gas line pressurizes the canister and chemical is dispensed through the chemical line to the tool.

1. Connect one end of the inert gas supply line tubing (typically a translucent, inert plastic such as PFA) to a filtered and regulated gas source.
2. Connect the opposite end of the inert gas supply line to the pressure inlet fitting on the dispense connector.
3. Connect the tool's chemical line to the liquid dispense fitting on the dispense connector.

NOTE: An optional depressurization kit can be installed in the inert gas supply line to control the pressurization and depressurization of the canister. See Changing Out Empty Canisters, page 27, for important information on depressurizing canisters before removing the dispense connector from a canister.

Connecting the Dispense Connector to a Canister

To use a filled canister, the end user installs one of the three dispense connector types (ND-CD, ND-LD, or MaxMT) onto the canister.

NOTE: The end user must ensure that the dispense connector threads match the threads on the connector base or canister neck. See Appendix B: Canister Compatibility Matrix, page 32, for information on which dispense connectors can be used with each canister.

1. Verify that the chemical inside the canister exactly matches the chemical required at the dispense connector to be used.
2. Verify that the three-way pressure control valve is closed.
3. Verify that the liquid dispense control valve is closed.
4. Select a liner-based canister filled with the desired chemical.
5. Unscrew the closure cap (or one-piece closure), Figure 43. Keep the cap (or closure) for canister return.



Figure 43. Removing the closure cap (two-piece 10- to 40-liter closure shown).

6. Hold the dispense connector by the body and position the connector directly over the canister opening.
7. Insert the probe of the dispense connector into the canister. Press downward with a sharp movement to snap the probe through the breakseal.

IMPORTANT: Failure to center the probe and provide a sharp force to rupture the breakseal may result in interference between the probe/breakseal and coupler. This interference can result in dispense difficulties.

8. Hold the top of the dispense connector and apply slight downward pressure. Rotate the lower threaded portion of the connector clockwise to engage and seal the connector to the interior diptube, Figure 44.

Do not overtighten. If the closure or canister threads are damaged or cross-threaded, liquid dispense may be affected.



Figure 44. Installing the dispense connector (ND-CD shown).

Dispensing Chemical from the Canister

Once the dispense connector has been attached to a canister, the end user operates the canister system to dispense chemical, Figure 42.

1. Verify the gas pressure at the regulator is set to the desired operating pressure.

⚠ WARNING: The maximum operating pressure is 101 kPa (14.7 psig) within the United States. Outside of the United States follow local regulations, which may require lower dispense pressure be used. The maximum internal canister pressure is 196 kPa (28.4 psig). Do not allow the pressure inside any canister to exceed this rating.

2. Open the three-way pressure control valve to pressurize the space between the canister and liner. The canister is pressurized to the gas regulator set point.

NOTE: Steps 3, 4, and 5 are different for the MaxMT dispense connector. The MaxMT system is equipped with a control box used to start and stop dispense from the canisters. See the appropriate user guide or data sheet for detailed instructions.

3. Verify the outlet of the liquid out line is attached to a reservoir or tool.
4. Displace the air in the liquid dispense line with chemical by opening the control valve to allow chemical to flow.
5. After all air has been removed from the dispense line the system is ready for normal chemical dispense. Pressure may be applied either intermittently or continuously until the canister is empty.

NOTE: If dispense is interrupted or discontinued for an extended period, Entegris recommends reducing the inert gas pressure inside the canister to minimize permeation of the headspace gas into the chemical.

Changing Out Empty Canisters

When a liner-based canister becomes empty, the end user removes the dispense connector from the empty canister and replaces it with a full canister of the same chemical.

NOTE: Different methods of detecting an "empty canister" condition are used for each of the dispense connector types. Refer to the appropriate dispense connector User Guide for complete instructions.

1. Close the liquid dispense valve.
2. Depressurize the canister by turning the three-way pressure control valve to the vent position until all canister pressure is relieved.

⚠ WARNING: 200-liter canisters must have internal pressure released before removing the dispense connector. If the canister is pressurized, the dispense connector may fly upward with great force while being removed. Serious injury or death may result.

3. Turn the lower connector body or collar counter-clockwise to disengage from the canister.
4. Lift the connector away from the closure and onto a cleanroom wipe to capture any residual chemical on the connector.
5. If connector maintenance is required, open the liquid dispense valve and allow any liquid in the outlet tube to return to the canister.
6. Lift the connector away from the closure and onto the wipe to capture any residual chemical on the connector, Figure 45.



Figure 45. Removing the dispense connector (ND-CD shown).

7. Perform any required maintenance on the dispense connector.
8. Install the closure or closure cap onto the empty canister. The empty canister is ready to be returned to a chemical supplier for refurbishment/refilling.
9. Install a new liner-based canister onto the dispense connector.

Troubleshooting Chemical Leaks


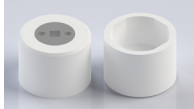

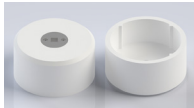

If chemical is observed leaking from the connection of the liquid dispense fitting to the liquid dispense line or the connection of the liquid dispense fitting to the upper connector body, the user should decide if the leak is excessive.

1. Depressurize the canister. Failure to depressurize the canister prior to adjusting or attempting maintenance may damage the fitting and result in system failure or possible injury.
2. Remove the dispense connector from the canister/closure.
3. Loosen the fitting nut attached to the connector probe so it can be turned by hand.
4. Retighten the fitting nut by hand until resistance is felt.
5. Tighten the fitting nut an additional $1\frac{3}{4}$ turn to ensure a proper seal is made to the end of the probe.
6. Reassemble the connector to the canister/closure.
7. Repressurize the system to normal operating conditions and check for leakage in accordance with internal procedures.
8. If leakage is detected refer to the appropriate Entegris dispense connector user guide for maintenance and troubleshooting information.







APPENDIX A: REQUIRED TOOLS

Entegris provides the following specialized tools for filling, operation, and maintenance of the liner-based canister system.

Contact Entegris at +1 978 436 6500 to order these tools.

TOOL	PART NUMBER	
Torque wrench (1/2" drive)	NA-18 (4- to 40-liter)	
	NA-33 (3/8" drive with 1/2" adapter, 4- to 40-liter) for use with NC-W2 polypropylene closure	
	NA-92 (200-liter)	
Torque adapter tool	NA-10 (4- to 40-liter with two-piece NC-03 or NC-04-type aluminum closure)	
	NA-03 (20-liter with one-piece NC-W2 polypropylene closure)	
	DA-06 (200-liter)	
CONTAINER SIZE	TORQUE WRENCH TO OPEN AND CLOSE CANISTER CLOSURE	USED WITH THIS TORQUE ADAPTER TOOL
4- to 40-liter (with two-piece closure)	NA-18	NA-10
4- to 40-liter (with one-piece closure)*	NA-33	NA-03
200-liter	NA-92	DA-06
Diptube removal tool	NA-13	

*Either the NA-33 or the NA-18 may be used to torque the NC-W2 polypropylene closure.

Liner removal tool	NA-06 (4- to 40-liter)	
	DA-04 (200-liter)	
Liner insertion tool	NA-60 (4- to 40-liter)	
	NA-60-200 (200-liter)	
Breakseal insertion tool	NA-23	
O-ring removal tool kit	NA-27	
Manual inflation fixture	NA-41 (20-liter with one-piece closure)	
	NA-41-200-2 (200-liter)	
	NA-41-8990 (4- to 40-liter with two-piece closure)	

**Automated bag
inflation fixture
(BIF) (4- to 20-liter)**

NF-01-FR



**Optional booster
locating plate for
NF-01-FR (adjusts
height for 4-liter
canister liner inflation)**

NA-107



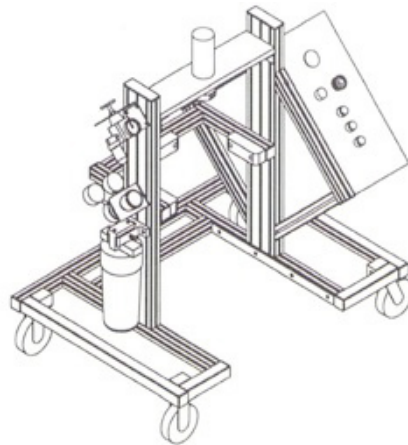
**Optional locating
plate (for 10-
and 18-liter canister)**

NA-135

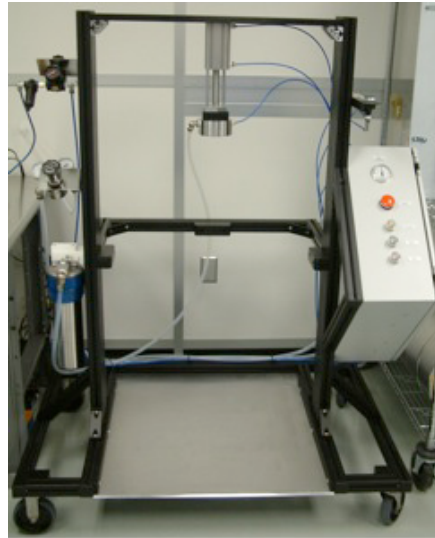


**Automated bag
inflation fixture
(BIF) (40-liter)**

NF-40-FR



Automated bag inflation fixture (BIF) (200-liter) NF-180/200-FR



APPENDIX B: CANISTER COMPATIBILITY MATRIX

The following table provides a quick method of checking which components can be used with each of the liner-based canister sizes (4- to 200-liter).

Not all possible configurations are shown. Contact Entegris for additional configuration options.

IMPORTANT: The user must ensure that the selected liner is properly sized for the canister being used. Entegris does not recommend using any diptube or liner designed or provided by anyone other than Entegris.

Capacity	Canister	Liner	Closure	Closure O-ring type	Diptube	Diptube O-ring type	Dispense connector
4-liters	NO-04	NL-004-T420A-1 NL-004-N500C-1-KA	NC-03 NC-03-2	EPDM FEP-encapsulated silicone	NDT-T4 NDT-T4-C	EPDM Chemraz	ND-CD-SXXX-XXX
4-liters	NO-04-63	NL-004-T420A-1 NL-004-N500C-1-KA	NC-04 NC-04-2	EPDM FEP-encapsulated silicone	NDT-T4 NDT-T4-C	EPDM Chemraz	ND-CD-SXXX-XXX
10-liters	NO-05	NL-010-T420A-1 NL-010-N500C-1-KA	NC-03 NC-03-2	EPDM FEP-encapsulated silicone	NDT-T5 NDT-T5-C	EPDM Chemraz	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)
10-liters	NO-05-63	NL-010-T420A-1 NL-010-N500C-1-KA	NC-04 NC-04-2	EPDM FEP-encapsulated silicone	NDT-T5 NDT-T5-C	EPDM Chemraz	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)
18-liters	NO-09	NL-018-T420A-1 NL-018-T650A-1 NL-018-N500C-1-KA	NC-03 NC-03-2	EPDM FEP-encapsulated silicone	NDT-T9	EPDM	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)
18-liters	NO-09-63	NL-018-T420A-1 NL-018-T650A-1 NL-018-N500C-1-KA	NC-04 NC-04-2	EPDM FEP-encapsulated silicone	NDT-T9	EPDM	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)
19-liters	NO-08	NL-020-T420A-1 NL-020-T650A-1 NL-019-N500A-1-KA NL-019-N500C-1-KA NL-019-N500D-1-KA NL-019-NS50C-1 NL-019-NS50A-1	NC-03 NC-03-2	EPDM FEP-encapsulated silicone	NDT-T8 NDT-T8-C NDT-P8 NDT-P8-C NDT-P8-F	EPDM Chemraz EPDM Chemraz Semi-perfluoro-elastomer	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)

Capacity	Canister	Liner	Closure	Closure O-ring type	Diptube	Diptube O-ring type	Dispense connector
19-liters	NO-08-63 NO-08A-63	NL-020-T420A-1	NC-04	EPDM	NDT-T8	EPDM	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)
		NL-020-T650A-1	NC-04-2	FEP-encapsulated silicone	NDT-T8-C NDT-P8 NDT-P8-C NDT-P8-F	Chemraz EPDM Chemraz Semi-perfluoro-elastomer	
		NL-019-N500A-1-KA					
		NL-019-N500C-1-KA					
		NL-019-N500D-1-KA					
		NL-019-NS50C-1 NL-019-NS50A-1					
20-liters	NO-07 NO-07-1	NL-020-T650B-1	NC-04	EPDM	NDT-T7	EPDM	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT) ND-LD-15 ND-LD-16 ND-LD-19
		NL-020-T420B-1	NC-04-2	FEP-encapsulated silicone	NDT-T7-C	Chemraz	
			NC-W2*	PTFE seal			
40-liters	NO-40 NO-40A	NL-040-N500D-1-KA	NC-03	EPDM	NDT-T40	EPDM	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)
		NL-040-N500G-1-KA	NC-03-2	FEP-encapsulated silicone	NDT-T40-C NDT-P40 NDT-P40-C	Chemraz EPDM Chemraz	
		NL-040-NS50D-1					
		NL-040-NS50A-1					
40-liters	NO-40-63 NO-40A-63	NL-040-N500D-1-KA	NC-04	EPDM	NDT-T40	EPDM	ND-CD-SXXX-XXX ND-ED-S-2 (MaxMT)
		NL-040-N500G-1-KA	NC-04-2	FEP-encapsulated silicone	NDT-T40-C NDT-P40 NDT-P40-C	Chemraz EPDM Chemraz	
		NL-040-NS50D-1					
		NL-040-NS50A-1					
200-liters	NO-200 NO-200-2 NO-200A NO-200A-2	NL-200-N500F-1-KA	NC-200-2	FEP-encapsulated silicone	NDT-T200-2-E NDT-T200-C NDT-T200-F	EPDM Chemraz Semi-perfluoro-elastomer	ND-CD-XCXX-XXX
		NL-200-N500K-1-KA					
		NL-200-T650K-1	NC-200-4	EPDM			
		NL-200-T650M-1			NDT-T200-2-F	Semi-perfluoro-elastomer	
		NL-200-NS60F-1					
		NL-200-NS60K-1					
		NL-200-NS60G-1					
		DL-1-T650-1					
					NDT-P200 NDT-P200-C NDT-P200-F	EPDM Chemraz Semi-perfluoro-elastomer	

*The NC-W2 closure is available to all 63 mm neck thread option canisters, including 20-liter canisters.

APPENDIX C: ORDERING GUIDE

Visit www.entegris.com for ordering information for the NOWPak liner-based canister system components. To order accessories and spare parts, contact Entegris at +1 978 436 6500.

LIMITED WARRANTY

Entegris' products are subject to the Entegris, Inc. General Limited Warranty. To view and print this information, visit entegris.com and select the [Legal & Trademark Notices](#) link in the footer. Entegris does not warrant any failure in the case of customers using unapproved foreign components.

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