

## Emergency Response Information

For Corteva products, call 1-800-992-5994.

For non-Corteva products, call Emergency Phone Number provided on the Product Label or SDS.



# Bulk Storage and Handling Guide

For Corteva Agriscience™ Bulk Liquid Pesticide Products

This document provides general guidance regarding the bulk storage and handling of liquid pesticide products from Corteva Agriscience.

It is to be used in conjunction with product-specific Supplements.

05/29/2025 - Document Number: 10002755028

® ™ Trademarks of Corteva Agriscience LLC and its affiliated companies



# Bulk Storage and Handling Guide

## TABLE OF CONTENTS

<b>Introduction .....</b>	<b>3</b>
<b>Product and Safety Information .....</b>	<b>4</b>
Product SDS and Label Information.....	4
Product Specific Supplements .....	4
Product Density versus Temperature .....	4
Flash Point, NFPA Rating, Storage Temperature, EPA Signal Word .....	5
Material / Product Compatibility .....	5
Personal Safety: PPE, Exposure Symptoms, and First Aid .....	5
<b>Bulk Equipment and Procedures .....</b>	<b>8</b>
General Bulk Site Information .....	8
General Bulk Site Requirements .....	10
General Bulk Site Recommendations .....	11
Secondary Containment .....	12
Bulk Tank Requirements.....	14
Venting .....	15
Piping, Pumps, Meters, And Other Equipment .....	17
Bulk Tank Labeling.....	19
Bulk Tank Cleaning .....	20
Bulk Tank Filling.....	21
Bulk Tank Mixing .....	22
<b>Portable Refillable Container Handling .....</b>	<b>23</b>
General Requirements & Recommendations.....	23
DOT Transport Regulations .....	25
EPA Repackaging Requirements & Refillable Labeling .....	25
Refillable Container Mixing .....	26
General Recommendations.....	27
<b>Environmental &amp; Emergency Information .....</b>	<b>27</b>
Environmental Fate and Wildlife Toxicity .....	27
Fire, Spills, and Clean-Up.....	27
CERCLA Reportable Quantities (RQ) and SARA Listing .....	30
FIFRA 6(a)(2) Adverse Effects Reporting .....	30
<b>References.....</b>	<b>31</b>
<b>Appendices.....</b>	<b>33</b>
Appendix A – Corteva Approved Portable Refillable Containers .....	33
Appendix B – Residue Removal Procedure for Portable Refillable Containers .....	34

To obtain additional copies of this Bulk Storage & Handling Guide, or the product-specific Supplements, see <https://www.corteva.us/> or contact your Corteva Territory Manager or Sales Representative.

# INTRODUCTION

---

Use of bulk liquid agricultural pesticides can be safe, convenient, and cost effective for large volume users. This Bulk Storage and Handling Guide is part of the continuing Product Stewardship Program and Responsible Care® initiatives of Corteva Agriscience™. The Guide describes practices and equipment believed to be suitable for handling Corteva Agriscience products as noted. This Guide also includes Corteva Agriscience requirements for new bulk systems and explains how to improve existing ones.

This Guide is not intended as, and should not be used as, a substitute for engineering or legal advice. Applicable legislation and regulations are constantly changing. Future regulatory and judicial developments may necessitate changes in the guidelines and procedures recommended in this Guide. Each user or handler of bulk products is responsible for compliance with all applicable federal, state, and local laws, regulations, and codes. Each user or handler of products is responsible to always read and follow product label directions.

For more information, contact your local government agencies responsible for regulating the operations in question.

*Responsible Care® is the chemical manufacturing industry's environmental, health, safety and security performance initiative. For more than 30 years, Responsible Care has helped American Chemistry Council (ACC) member companies significantly enhance their performance and improve the health and safety of their employees, the communities in which they operate and the environment as a whole. Corteva Agriscience fully supports the initiative of Responsible Care and the implementation of the program at pesticide handling facilities worldwide.*

*NOTICE: The information, procedures, methods, and recommendations herein are presented in good faith and are believed to be accurate and reliable as of the publication date but may well be incomplete and/or not applicable to all conditions or situations. No representation, guarantee, or warranty is made as to the accuracy, reliability, or completeness of said information, procedures, methods, and recommendations. Nor is any representation, guarantee, or warranty made that application or use of any of the same will avoid hazards, accidents, losses, damages, or injury of any kind to persons or property, or give desired results, or that the same will not infringe patents of Corteva Agriscience™. Readers must satisfy themselves as to the suitability of said information, procedures, methods, and recommendations prior to use.*

\*Responsible Care is a registered service mark of American Chemistry Council (ACC) in the United States.

## PRODUCT AND SAFETY INFORMATION

---

### Product SDS and Label Information

Consult the Safety Data sheet (SDS) and / or product label for specific product information before handling any products or pesticides. For additional copies:

- Contact your local Corteva sales representative, or
- Go online at [www.corteva.us/labels-and-safety-data-sheets.html](http://www.corteva.us/labels-and-safety-data-sheets.html) or <http://www.cdms.net/Label-Database> or <https://home.agrian.com/>

The SDS contains information on:

- |   |   |
|---|---|
| • Chemical Product                                  | • Exposure Controls / Personal Protection |
| • Company Identification                            | • Physical and Chemical Properties        |
| • Composition/Information on Ingredients            | • Stability and Reactivity                |
| • Hazards Identification (Potential Health Effects) | • Toxicological Information               |
| • First Aid   | • Ecological Information                  |
| • Fire Fighting Measures                            | • Disposal Considerations                 |
| • Accidental Release Measures                       | • Transport Information                   |
| • Handling and Storage                              | • Regulatory Information                  |
|   | • Other Information                       |

The Label contains information on:

- |  |   |
|--|---|
| • EPA Signal Word and Precautionary Statements | • Container Handling and Cleaning for Refillable Containers |
| • Directions for Use                           | • Terms and Conditions of Use                               |
| • Storage and Disposal                         | • Warranty Disclaimer or Limitations of Remedies            |

### Product Specific Supplements

There are Corteva product specific supplemental information documents that provide specific information on Product Density versus Temperature, added details on Flash Point, NFPA, and EPA signal Word, and Bulk Storage Construction and Handling Material compatibility details. These supplemental documents are found at <https://www.corteva.us/Resources/Bulk-Storage-and-Handling-Guides.html> or can be obtained from your Corteva Territory Manager or Sales Representative.

### Product Density versus Temperature

Specific density versus temperature charts are in the product-specific Supplements to this Guide. Temperature affects the density (weight per volume) of a product. This affects meters that are not temperature compensated. The information provided in the Guide Supplements is only a guide. Charts may not reflect exact standard density used for billing, and individual lots may vary within normal limits.

## Flash Point, NFPA Rating, Storage Temperature, and EPA Signal Word

The product specific Supplements contain information on flash point, NFPA rating, minimum storage temperature, and EPA signal word.

**Flash point** of a bulk product determines many storage requirements. Although Authorities Having Jurisdiction may make exceptions, products with flash points below 200 °F require:

- Self-closing emergency relief vent (ERV) capability and pressure relief valves (PRV).
- ERV and PRV to be vented outside.
- Non-combustible bulk tank (i.e. no poly)
- Class 1, Division 1 or 2, “Explosion proof” electrical installation for products less than or near 100 °F flash point. These products also require fire-safe valves next to the tank.

**The NFPA Rating** provides a numerical rating of the health, flammability, and reactivity and are posted on a diamond label on or near the bulk tank area. This information assists fire responders.

**Minimum Storage Temperature** is a guide to help avoid issues such as the potential formation of crystals in some emulsifiable concentrate (EC) and soluble liquid (SL) products at low temperatures due to decreased solubility at lower temperatures. It is preferred to keep products from freezing to avoid potential freeze expansion damage to storage tanks, piping, and pumps. However, minimum storage temperature for some water containing products may not be restricted at 32 °F as history shows no problems upon thaw after freezing.

**Label Statement or Signal Word** is a quick point of reference from the product label. This will be CAUTION, WARNING, or DANGER. The signal word may be for a particular characteristic, such as eye injury or irritation. Higher signal words generally signal an increasing level of required PPE.

## Material / Product Compatibility

The bulk storage material (tanks, hoses, pumps, seals, etc.) compatibility with the agriculture product depends on their respective physical properties. In addition to Supplemental Information, the parts supplier will have further compatibility information.

## Personal Safety: PPE, Exposure Symptoms, and First Aid

### Product Label and SDS: Personal Protective Equipment (PPE)

The product use label describes the minimum Personal Protective Equipment (PPE) required for applicators and handlers of the product in a well-ventilated area per label instructions. Additional protective clothing can be worn. See the product label for PPE for entry into treated areas during any restricted entry interval (REI).

Consult the product’s SDS for manufacturing, commercial blending, and packaging worker protection standards and handling precautions. PPE for such uses may vary slightly from the product label.

Users should determine the required PPE from the product label for each of the following:

- **Eye Protection:** Many labels will call for chemical goggles, which provide superior splash protection than safety glasses.
- **Hand Protection:** Usually this is chemical resistant gloves.
- **Body Covering:** This may vary from long sleeve shirt & pants, to a chemical resistant apron, to a full body chemical resistant suit.

- **Foot Protection:** Shoes and socks must always be worn, but some labels require chemical resistant boots or shoe coverings.
- **Inhalation Protection:** Respiratory protection is not normally required where there is good ventilation, but there are exceptions. Some products require organic vapor respiratory protection if local ventilation is inadequate, and others may require it during any use. Check the label. Always avoid breathing vapor or spray mist.
- **Ingestion Protection:** The best method of protection against ingestion or swallowing is good hygiene. Wash hands frequently especially before eating, using tobacco, using the restroom, or using products like gum.

**Closed Transfer System Requirements.** Some product labels require the use of closed transfer systems, or optionally offer relief from certain PPE requirements if closed transfer systems are used. Generally, this information will appear on the first or second page under “Engineering Controls”, or similar title.

**Worker Protection Standard Exemptions.** Some product labels allow for reductions in PPE if the use is considered a non-WPS use, or if the product is used with closed systems, closed cabs, or closed aircraft. See the specific product label, along with 40 CFR Part 170 for more information.

## Other Personal Safety Practices

In addition to the requirements found on the product label and the SDS, other sections of this guide, and within in product specific Supplemental material, the following are good bulk product handling practices.

1. After a spill or leak, clean the area and equipment as soon as possible. Decontamination should be done by properly protected and knowledgeable people.
2. Maintain a NIOSH approved full-face air purifying respirator or self-contained breathing apparatus on site, and have key personnel trained to use it.
3. Maintain chemically resistant gloves, boots, face shield, full-body suit (or apron) on site.
4. Assure that a safety shower and eyewash station are present and working in the bulk area.
5. Instruct personnel to wash hands, arms, face, and any exposed skin with soap and water after handling or coming in contact with the product.
6. If clothing becomes contaminated, stop work immediately. Remove contaminated clothing and wash exposed skin with soap and water.
7. Leather is often very difficult to adequately decontaminate, depending on the product. Consult the product label, but a protective covering is recommended and may be required. Once contaminated, it may be necessary to destroy leather articles.

## Exposure Symptoms and First Aid

The respective product SDS and label are the first sources of exposure hazard information in determining first aid treatment for an exposure. Have personnel review the SDS before product use and annually thereafter. Always read and follow label instructions.

Section 11 of the SDS, “Toxicological Information” provides potential exposure symptoms and potential exposure injuries.

See “First Aid” of label or Section 4 of the SDS for first aid instructions and a note to physicians.

The SDS and the product label lists the Corteva Agriscience Emergency Response number (1-800-992-5994). Use this number to obtain advice and arrange for professional help, as needed, to assist with an emergency.

If a person is exposed to the product and requires medical treatment, have a copy of the SDS and the product label available to medical responders and/or send a copy with the person to the medical treatment facility.

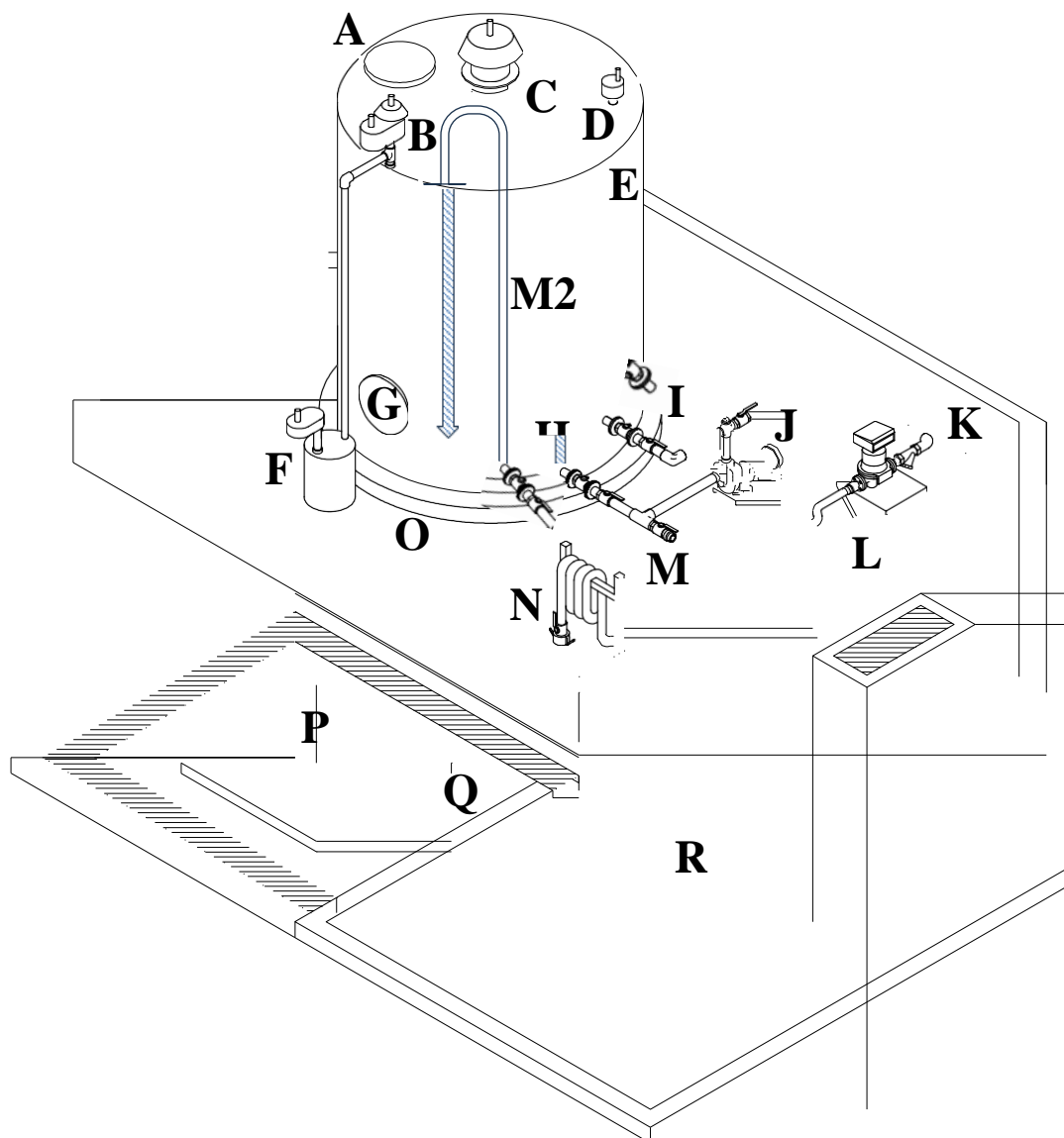
## BULK EQUIPMENT AND PROCEDURES

### General Bulk Site Information

Prior to establishing a bulk handling facility, the owner or operator must obtain all required permits and comply with all applicable laws and regulations governing the storage of bulk agricultural products. The bulk facility must meet Corteva Agriscience requirements in addition to federal, state, and local codes, laws, regulations, and ordinances covering such product systems. These include, but are not limited to, those issued by the federal and state Department of Transportation (DOT), Occupational Safety and Health Act (OSHA), and the Environmental Protection Agency (EPA).

### Typical Bulk Site Components

Sites may vary in detail, but all will have components that perform similar functions. Refer to the image below and the chart on the following page.





**Typical Bulk Site Components (continued)**

	Item	Comment
<b>A</b>	Man Way	Enables easier tank inspection & clean-out of tank. May serve as ERV in some cases.
<b>B</b>	Pressure / Vacuum Conservation vent	Required for certain suspensions to avoid drying. Required for flammable & combustible products per NFPA. Must vent outside building if flash point <200°F. Relieves tank during normal breathing.
<b>C</b>	Emergency Relief Vent (ERV)	ERV capability is required by NFPA for flammable and combustible products. Relieves pressure in a fire. Must vent outside building if flash point <200°F. See Venting section of this guide.
<b>D</b>	Level Indicator	Various systems exist. Some means of indication required; Automated preferred. External sight tubes are prohibited by EPA after August 2011.
<b>E</b>	Bulk Tank	See “Bulk Tank” section for materials and code requirements.
<b>F</b>	Air Dryer	Required for certain products. Nitrogen pad is an alternative.
<b>G</b>	Side Man Way	Enables easier tank inspection & clean-out of tank. Confirm gasket compatibility.
<b>H</b>	Fire Safe Valve	First outlet valve below liquid surface of certain low flash point products must have (a) a normally closed remotely activated valve; (b) an automatic-closing, heat activated valve; or, (c) another approved device. Not required for most products.
<b>I</b>	Recirculation w/angled Jet Nozzle	For product recirculation of tank contents from bottom through a jet nozzle angle from the bottom of the tank towards the liquid surface at the opposite end of the tank to enable mixing of the entire tank to top to form a homogeneous solution. Locking Ball Valve required for valves below liquid level.
<b>J</b>	Centrifugal pump and motor	Electrical wiring must meet local code or NEC #70, including Hazardous Zone wiring for products below 100°F flash point.
<b>K</b>	Strainer	See other sections of this Guide for recommendations.
<b>L</b>	Meter	Scale may be used instead, if appropriate.
<b>M</b>	Fill Connection	See other sections of this Guide for coupler requirements. Locking Ball Valve required for valves below liquid level.
<b>M2</b>	Dip-Pipe Fill	For top tank fill for materials with flashpoints < 200°F (combustible or flammable), or materials that have high tendency to foam with free-fall product. Locking Ball Valve required for valves below liquid level.
<b>N</b>	Dispensing Hose	Confirm product compatibility.
<b>O</b>	Dike	Note raised pad for tank to help detect leaks. Slope floor to a sump.
<b>P</b>	Scale	May be used instead of a meter, if appropriate.
<b>Q</b>	Scale Containment	Container filling must be done within containment.
<b>R</b>	Truck Load Pad	Inbound and outbound truck transfers must be over a pad.

**Not Shown**

- Safety Shower & Eye-wash / Internal mixing eductor or nozzle on circulation line / Dike sump
- Bulk supply equipment distributors are listed in reference section at the end of this guide.

## **General Bulk Site Requirements**

1. Bulk product handling facility and operating procedures comply with all federal (applicable portions of 40 CFR 165), state, and local handling laws and regulations.
2. Facility will have appropriate signed Evergreen Agreement with Corteva Agriscience.
3. Rain water management complies with state and federal storm water regulations.
4. The tank, pump, meter, hose, and piping herbicides must be located within the dike or containment area.
5. Bulk location has a contingency plan for spills, leaks, fire, and other emergencies.
6. Handling meets or exceeds the Worker Protection Standard.
7. Protective equipment, spill containment equipment and absorbent are available on site to handle minor spills or releases.
8. Proper means of waste disposal are provided where needed for systems operations and cleaning.
9. A NIOSH approved emergency eye wash station is located near the bulk area.
10. A safety shower is available near the bulk area.
11. All bulk loading and unloading risers shall be identified by color or markings to identify product and prevent cross-contamination.
12. Physical or electronic copies of SDS's are available on site to all employees.
13. Materials used for construction of tanks, screens, strainers, valves, fittings, hoses, meters, pipes, seals, gaskets, and pumps are compatible with products stored.
14. Electrical installations meet the state and local electrical codes or should conform to the National Electric Code (NFPA 70) if a state or local code doesn't exist. Installations for products with flash points below or near 100°F must meet requirements for Hazardous Zones, e.g. "explosion proof" or intrinsically safe components unless the local Authority Having Jurisdiction allows otherwise.
15. Bulk handling and storage facility must comply with the state fire code, or the National Fire Protection Association (NFPA) Standards for Flammable and Combustible Liquids Code (NFPA 30) if no state fire code exists.
16. Water sources are protected from back siphoning.
17. Pesticides are not stored in the same area as food, feed, clothing, or animal health products.

## **General Bulk Site Recommendations**

1. Implement a preventative maintenance program to repair and replace hoses and other equipment as appropriate.
2. Provide lighting around the bulk handling facility bright enough to provide for easy reading of package label information.
3. Post conspicuous signs which prohibit smoking within 50 feet of bulk handling area.
4. Proper air ventilation is present for indoor bulk facilities. (NFPA 30)
5. A fire inspection is conducted annually by an external party such as the local or state fire marshal. Written records of inspections are maintained.
6. The fire department reviews the “Emergency Action Plan” annually.
7. A security system is in effect at the site. This may include a fence immediately around the bulk storage location (minimum of 6 feet above ground level), alarms, or a locked building.
8. Equipment is free from leaks at seams, couplings, packing glands, valves, points of closure, etc.
9. At the end of the application season, pumps, meters, piping, and dispensing hoses should be prepared properly for the off season.
10. No bulk mixing or loading is done within 150 feet of an unprotected well site. Well sites are identified and comply with state and federal guidelines.
11. Housekeeping occurs on a routine basis to assure that spills are promptly cleaned up, debris is removed, and empty containers and hoses are properly stored.
12. Each bulk handling area has a fire extinguishing capability deemed appropriate by the responsible local or state authorities. (minimum: 20 lb. ABC dry chemical fire extinguisher)

## Secondary Containment

### Requirements

1. All bulk tanks must have secondary containment. Containment design must follow state and federal requirements, plus those of NFPA 30 Flammable and Combustible Liquids Code, or those listed below—whichever is more stringent.
2. Containment structures (dikes and load pads) must be compatible with the products stored or transferred. They must be constructed of reinforced concrete, steel or other rigid material. Concrete block walls--reinforced with re-bar--which are filled, capped and sealed are permitted, but concrete block or steel systems are not recommended. Natural earthen material, unfired clay and asphalt are prohibited.
3. The structure must be liquid-tight with cracks, seams and joints sealed with chemically resistant materials. The containment must support the gravity load of all full tanks and be able to withstand the potential hydraulic load.
4. Dikes must contain 100% (under roof) or 110% (without roof) of largest tank volume plus displacement for all other storage tanks or be designed to applicable state or federal laws, regulations and codes if more restrictive.
5. The load pad must hold at least 750 gallons, or at least 100 percent of the largest container on the pad up to 750 gallons; or meet state requirements—whichever are more stringent. A rigid, liquid-tight pad must exist for transfer of product between the bulk tank and all delivery trucks, nurse vehicles, refillable containers, application equipment or other containers. Container cleaning must also be done over containment.
6. US EPA requires the tank be elevated or anchored to prevent floatation.
7. US EPA requires operational area containment (e.g. load pads) constructed after November 16, 2006 to be sloped to a collection point or sump. Some states may also require the floor of the dike to be sloped toward a sump.
8. The tank, pump, and meter (if used) must be located within the dike.
9. All outlets or drains in the secondary containment must be permanently plugged and sealed. However, drains to other adjacent containment areas may be permitted.
10. Automatically activated sump pumps are not allowed. Manual controlled pumps may be used. Pumps must be rated for flammable service if product flash point is less than 100°F.
11. Do not permit other bulk tanks made of combustible materials (polyethylene) in the same containment as tanks containing flammable and combustible liquids. This is an NFPA 30 requirement, and exceptions should be approved by the local authority having jurisdiction.
12. Visually check integrity of the stationary pesticide containers, secondary containment and load pad, including sumps, on a frequency to comply with EPA requirements, including 40 CFR 165.90 to 165.95. In general, this requires monthly documented inspections.
13. Tank-in-tank, or double walled tank designs which incorporate their own secondary containment, are allowed. However, they are discouraged due to difficulty of inspecting the containment integrity. If used, tank-in-tank designs must meet the requirements for emergency venting and leak monitoring indicated in NFPA 30. NFPA also limits tank in tank size to 12,000 gallons or less.

14. Rail site spill containment, drainage systems, or grading shall be present such that a spill of the entire rail car shall not run off the site or expose people, important structures, properties, and environmental features to uncontrolled spilled liquid. Impervious containment is recommended, at least for small spills at point of connection.

## Recommendations

1. A roof over the bulk tank and diked area is recommended to minimize rainwater contamination and the need for proper disposal of this water. A roof over the containment pad is also recommended. If flammable or combustible liquids are present, be sure the design does not constitute an indoor storage facility or building. This would trigger additional NFPA venting and electrical requirements.
2. Contiguous concrete containment between dike and transfer area is recommended.
3. Avoid passing piping through dike walls. Run piping within the dike wall rather than along the top of the wall. However, drains to other containment areas may be permitted to pass through dike walls providing they can be valved off and locked when not in use, if state law permits.
4. The load pad should prevent liquids from seeping into or flowing onto it from adjacent land or structures during a 25 year, 24-hour rainfall event.
5. Spacing of the tank relative to other tanks, dike, and property lines shall follow NFPA 30. In general, there should be no less than 3 feet between the bulk tank and other tanks or the dike wall; 20 feet between the bulk tank and any property line that is or can be built upon; and 5 feet between the bulk tank and the nearest side of any public way or from the nearest important building on the same property.
6. Slope the floor of the dike to a sump large enough to permit withdrawal of liquid in the dike.
7. Avoid trapping liquid between the tank and the dike floor by setting tanks on a raised firm foundation within the dike, such as concrete or ring filled with pea gravel or oiled sand.
8. Use a vendor familiar with industry standard designs and procedures to construct containment.
9. Hydrostatically test new containment prior to installing the tank.

## Bulk Tank Requirements

1. Tanks require American Agronomic Stewardship Alliance (AASA) inspection every three years. Checklist can be found at: <http://aginspect.com/> program. For existing facilities, a current AASA checklist must be:
  - maintained on file at Corteva,
  - the checklist must be satisfactory to the Corteva Bulk Compliance Specialist,
  - and any identified inspection checklist deficiencies must have been addressed.
2. For new tank or for a product changeover, a Corteva Territory Manager or Sales Representative must perform a tank inspection and have the inspection approved by Corteva Bulk Compliance Specialist prior to product delivery.
3. Underground tanks are not permitted.
4. Stainless steel tanks are preferred for most products. See product specific Supplements for acceptable materials of construction.
5. Metal tanks must be of welded construction, designed and built in accordance with good engineering standards.
6. If state and local laws permit, polyethylene storage tanks may be utilized if the tank is free of cracks, UV degradation or other signs of aging or structural defects. Corteva Agriscience will not bear risk or liability associated with the use of polyethylene bulk tanks. Some products cannot use plastic tanks.
7. Bottom-loading tanks are recommended. Top-loading tanks must have a dip tube to prevent product free-fall. The dip tube must be supported to suppress vibration and shall incorporate a siphon-breaker (unless top unloading) just below the tank entry point to prevent siphoning from the tank. The lower end of the load dip tube shall be within 6 inches of the tank bottom. This is recommended for all tanks but required for products with flash point less than 200°F. This avoids static charging, air entrainment and foaming.
8. Tanks holding products with flash points below 200° F must be electrically grounded. (It is *recommended* that *all* tanks be grounded.)
9. Circulation capability is recommended for all tanks for use flexibility but is required for products as noted in the “Bulk Tank Mixing” section of this guide and for products that indicate this requirement on the supplemental information document.
10. Tank material of construction must comply with the information in the product-specific Supplements to this Guide. Mild steel or polyethylene tanks are not allowed with some products.

## Special Tank Requirements for Products with Flash Point below 200°F

11. Polyethylene bulk tanks are not allowed due to National Fire Protection Association Code 30 “Flammable and Combustible Liquids Code”. Tanks must be welded construction, designed and built in accordance with good engineering standards.
12. If the flash point is less than 110 °F, the tank must be built and marked to a recognized appropriate engineering standard, such as API or UL or other recognized body. As an alternative to a code tank, the owner may provide a letter from a certified Professional Engineer stating that the tank meets the requirements of use, and a letter from the state fire marshal or other

authority having jurisdiction approving use.

13. If the selected code is designed for products of specific gravity equal to or less than water, documentation declaring suitability for higher specific gravity products must be obtained. For example, exemptions are available from UL 142 tanks for materials with a specific gravity greater than water if the tank manufacturer submits design calculations and drawings for review by UL. API 650 standards or an approved equivalent may also be used.

## Bulk Tank Recommendations

1. Select and install tanks with cleaning, inspection, and repair in mind. Design to minimize heel volume and include an access man-way for cleaning and inspection.
2. If the tank is exposed to sun, paint the bulk tank white to minimize the internal temperature changes that occur. The reduced expansion and contraction of the contents will decrease vapor losses. This will also decrease demand for inert gas or dry air, where used.
3. Internal tank linings or coatings (if used) should be selected with caution as stored products may cause deterioration. Contact Corteva Agriscience before attempting to use internal tank linings or coatings.
4. Maintain tanks above the product's minimum storage temperature.
5. Cone bottom tanks are recommended where codes permit.
6. Purchase tanks which have openings large enough for attaching emergency vents to assure future flexibility for use of the tank. (Emergency vents are required for products with flash point less than 200° F.)
7. Bulk tanks should have a thorough inspection by knowledgeable professionals as prescribed by the requirements of the code to which it was built. As an alternative, follow guidance in STI SP001-03, Standard for Inspection of In-service Shop Fabricated Aboveground Tanks for Storage of Combustible and Flammable Liquids. STI-SP001-03 is available from the Steel Tank Institute (<http://www.steeltank.com> )

## Venting

The tank owner is responsible for knowing and complying with local, state, and federal laws on venting. Usually the local fire marshal is the "Authority Having Jurisdiction (AHJ)."

Normal venting of atmospheric tanks relieves pressure or vacuum when product is added or removed, or when temperature changes expand or contract head space vapors. This is usually accomplished with a self-closing vent known as a normal vent or pressure/vacuum relief vent (PVRV).

Emergency venting is designed to relieve large vapor volumes in the event the tank is exposed to fire. The difference between "normal" and "emergency" venting is primarily the flow capacity of the vent. Flow capacity in an emergency relief vent (ERV) is often more than 10 times a PVRV. For most tanks, normal venting can be achieved with a 2" port but emergency venting requires a 6", 8", 10" or even larger port.

### For products with flash point less than 200° F, most state codes require:

- Bulk tanks to have emergency relief capability.
- ERVs and PVRVs which re-close when the pressure is relieved.
- That vapors not be released indoors (i.e. be piped outside the building).

- The release point of vapors piped to outside be at least 12 feet above ground level in an area where vapors are not trapped by overhangs or other building structures.

Defining emergency venting capability is subject to interpretation by the AHJ or state and local codes. Some states require ERVs to have an UL or API certification and be stamped with rated flow capacity. For other states, a simple hinged man-way or long-bolt lid is sufficient.

Emergency and normal vents must be below the rated test pressure of the tank, and the normal vent must be below the Maximum Allowable Working Pressure of the tank. Often, the normal vent will be set at 8 oz/in<sup>2</sup> and the ERV is set at 16 oz/in<sup>2</sup>.

## Vent Requirements

1. Comply with local, state or federal regulations for venting, including special requirements for indoor tanks, if applicable.
2. Comply with the product specific chart below for bulk tank venting:

Vent Requirement	Products
<b>Self-closing ERV Capability<sup>1</sup> and PVRV Required</b> for these products by NFPA 30 due to flash point of the product. These vents must be self-closing.	Products with flash point less than 200° F.
<b>Self-closing PVRV Required</b> on these products to minimize moisture loss from the formulation, avoiding any surface “skinning” or formulation evaporation.	Especially important for water-based suspensions.
<b>Air Dryer or Nitrogen Pad Required</b> to avoid moist air in the tank to minimize corrosion.	Products capable of developing corrosive by products when subjected to moisture.

## Vent Recommendations

1. Prevent release of vapors to the inside of buildings even if local authority allows. This generally means venting the PVRV and ERV to outside and releasing vapors at least 12 feet above ground level in an area where vapors are not trapped by overhangs or other building structures. This is a requirement in many states for products with flash point less than 200°F.
2. Additional site requirements usually apply when storing products with flash point less than 200°F in indoor bulk tanks. Consult the AHJ or NFPA 30 before storing these products indoors.
3. Use equipment vendor assistance to select and size vents per calculations in NFPA 30 or other appropriate code.

<sup>1</sup> Size of the ERV should be determined using NFPA 30 Flammable and Combustible Liquids Code, or other appropriate code.



## Piping, Pumps, Meters, and Other Equipment

### Piping and Hose Requirements

1. No underground piping is allowed.
2. Piping and hoses must be compatible with the product. (see the Material/Product Compatibility section of the product-specific Supplements to this guide). Threaded or welded stainless steel pipe is preferred. Some products are not compatible with mild steel. Hoses with a braided cross-linked polyethylene or nylon liner are preferred. Wire reinforced EPDM lined hoses are acceptable for products compatible with EPDM.
3. Thread sealant must be compatible with the product. (see the Material/Product Compatibility section of the product-specific Supplements to this guide). Teflon tape is acceptable for all systems.
4. Pump, meter, and plumbing to and from the tank must be dedicated to the product.
5. Each opening below the liquid surface must have a lockable stainless-steel valve as close to the tank as is practical.
6. The hose must be rated above the maximum pressure of the pump.
7. All connections, drains, and sample ports should be capped or plugged when not in use.
8. If used, electrical heat tracing is UL-approved and self-limited to 100°F or less.
9. The system has a means of obtaining a representative product sample. Preferably, a sampling port is installed on the pumping system.
10. Each opening below the liquid surface for flammable and combustible liquids stored indoors must have (a) a normally closed remotely activated valve; (b) an automatic-closing, heat activated valve; or, (c) another approved device. That valve must be placed as close as possible to the tank wall and be rated as a fire-tested valve per API607 or other recognized standard.
11. For products with flashpoint < 110°F, or flashpoint < 10°C of ambient temperature, it is recommended that a dip pipe be used to add the product sub-surface to prevent misting of the product during free-fall addition as the atomization of the product further lowers the flashpoint.

### Piping and Hose Recommendations

1. All lines slope to low points which have drains to allow for easy inspection, cleaning, and maintenance.
2. Do not leave piping hydrostatically full. Rigid piping sections closed at both ends are not used or are designed to allow for thermal expansion of liquid without developing high pressures. (Rigid piping sections, completely filled with liquid, can develop a high hydrostatic pressure between blocks in the lines. Allowing these pressures to develop may cause leaks from packing, gaskets, and seals.)
3. Line sizes should be selected based on product flow rate, system design and pump specifications. Normally, 2" diameter is satisfactory.
4. Loading and unloading risers and lines should be identified by color, markings, or mechanical interlocks to identify product and avoid cross contamination.

## Pump and Meter Requirements

1. Wetted parts are compatible with the product (see the Material/Product Compatibility section).
2. Electrical motor switch and wiring meet National Electrical Code requirements where applicable.
3. Meter meets local, state, and federal regulations concerning weights and measures.
4. **Suspension Formulations:**
  - a) Three horsepower pump motors as a minimum are required; however, five horsepower motors are highly recommended for all products.
  - b) A double mechanical seal pump is required for products containing suspended solids to extend seal life. Double mechanical seals are recommended, but not required for other products.

## Pump and Meter Recommendations

1. The pump is sized to meet the transfer requirements at the bulk facility. Consider product temperature, viscosity, and specific gravity when sizing the pump and motor.
2. Do not operate pumps with the discharge line closed (dead head).
3. Centrifugal pump, if used, is self-priming.
4. Positive-displacement pumps should not be used with products having flash point below 110° F. If used with other products, positive displacement pumps must be equipped with a relief valve to the suction side of the pump or a by-pass back to the tank.
5. Dike sump pump is a diaphragm pump with a polypropylene casing and Teflon diaphragms or their equivalent according to the material compatibility chart. Automatic dike sump pumps are prohibited.

## Couplers

The bulk tank shall have the following couplers on the tank piping for receiving inbound shipments.

Customers have discretion in selecting couplers for dispensing from the bulk tank into their own fleets, as long as the coupler meets requirements in the section on refillable containers (i.e. mini-bulks, cylinders, or drums) as appropriate.

Product	Coupler
Products with flash point < 110° F. Certain insecticides.	2" male Civacon Kamvalok <sup>1</sup> Adapter with cap, or 2" male PT Couplings Company Maxi-Dry <sup>2</sup> MD20A adaptor with cap. (The Kamvalok and Maxi-Dry systems can be mated to each other, therefore either may be used.)
Most other products covered by this Guide.	2" Male metal camlock style adapter with cap.

<sup>1</sup>Trademark of OPW Engineered Systems    <sup>2</sup>Trademark of PT Coupling Company, Inc.

## Other Equipment Requirements and Recommendations

1. Sight gauges on bulk tanks are not permitted by EPA after August 2011. Existing sight gauges may not use glass tubes and must use a self-closing valve. Alternatives include float level devices, meter readings, ultrasonic level instrument, or other devices which do not allow for cross-contamination.
2. Use strainers, valves, and couplings constructed of stainless steel and rated for a minimum 150 psi.
3. Valve packing are not recommended, but if used, should be nylon, Viton, Teflon, or braided Teflon. Use Teflon seats for ball and plug valves.

4. Strainers use a stainless-steel screen ahead of the meter. The mesh size of the screen should be specified by the meter manufacturer but not finer than 40 mesh. Mesh size for suspensions should be coarser.

## Bulk Tank Labeling

### Each bulk tank must have the following:

- Product label provided by Corteva Agriscience,
- The proper EPA Establishment Number of the producing facility (i.e. the Corteva Agriscience manufacturing location and Net Contents noted on the label)
- NFPA 704 diamond label (on tank, building, or dike area as required by local or state regulation), and
- Other tank labels required by federal, state, or local regulations must also be attached, if required.

Corteva Agriscience will make available the product label and NFPA diamond label through the label ordering web site, (<https://powertopromote.worksmartsuite.com/UserContentStart.aspx>), or call your sales representative or Corteva at 1-800-258-3033 to obtain an additional bulk tank label packet.

### Bulk Tank Label Instructions

1. **Remove old** bulk tank labels BEFORE affixing the new bulk tank label to the bulk tank.
2. Securely affix the product label onto the tank in an easily visible location.
3. Write the net contents and EPA Establishment Number on the label.
4. Add a NFPA 704 diamond label to the tank, building, and/or dike area as required by local or state codes.
5. Add any other labels or information, such as DOT UN number, as required by local or state codes.

### Example Label

The Corteva Agriscience product label incorporates a product booklet and tank label in a single, adhesive backed design.



Example - Product Label / Booklet



NFPA 704 Diamond

### Net Contents and EPA Establishment Number

**For bulk storage tanks**, check or write the EPA Establishment Number of the producing facility (i.e. the Corteva Agriscience manufacturing location), on the product label.

**For refillable containers** (e.g. cylinders, nurse trucks, field storage tanks), write in the EPA Establishment Number of the repacking or refilling facility, on the product label.

## Bulk Tank Cleaning

### Preparation

A bulk tank must be clean, dry, and free of all contaminants before it is filled. Bulk tanks containing Corteva Agriscience bulk products can be cleaned using the cleaning procedure described below. Always wear proper protective equipment as recommended in the product's SDS during inspection and cleaning.

Bulk tank clean-out approval includes the following:

- No visible solids are allowed on the interior of the tank and piping.
  - EPA required clean out limits for product integrity are met per PR Notice 96-8.
  - Internal Corteva Agriscience minimum requirements for product integrity and following product restrictions are followed, including any cleaning guidance found on product specific Supplemental Information guides
- Enlist® herbicide products require following a strict cleaning and shared equipment protocol. Consult Corteva Agriscience personnel for these specific cleaning requirements and product integrity protocol for Enlist products.

### Procedures

1. Drain all liquid into a DOT approved disposal container.
2. Visually inspect the tank interior.
3. Remove any loose solid material.
4. Spray bottom first with water to loosen any residue in the sump or cone before cleaning. Use a pressure washer delivering 2 to 5 gpm to minimize water volume.
5. Spray under roof shell, then inside wall of tank, working from top of the walls down. Use water volume necessary to spray all surfaces. (If water fails to remove solids, consider using liquid fertilizer as an alternative to soften solids.)
6. If the system can circulate, circulate 10 minutes to loosen material and solids in the tank and piping. (Add water volume as needed to avoid starving the pump).
7. Drain the tank using the system pump, preferably exiting through the meter.
8. Repeat steps 2 through 6 above two more times, for total of three rinses. Use hot water and detergent if residue remains.
9. Disassemble and clean or replace screen and hoses. Replacement may be required when certain products follow other products.
10. Inspect the inside of the container. The container must be free of residues on the inside wall of the container.
11. Drain and dry entire system, container, piping, meter and strainer prior to filling with another product.
12. Document cleaning date and procedure.
13. Dispose of the wash water in accordance with the federal, state, and local laws and regulations.

## Bulk Tank Filling

### General Requirements for Bulk Tank Filling

1. Transfer procedures must follow the practices as required by the DOT, CFR 49, Chapter 1.
2. For truck shipments from Corteva Agriscience or its terminals, **the driver and at least one qualified employee of the receiver shall be present and attentive to the operation** as long as the truck is connected to the system. Railcar unloading requires two qualified and attentive persons to be present.
3. Product from such trucks or from a railcar should be transferred directly into Corteva Agriscience approved stationary bulk tanks located within a diked area and is not to be directly loaded into other trucks, cylinders, or other portable refillable containers.
4. Personnel conducting the unloading operation must wear personal protective equipment (PPE) as required by the product label. They must understand the safety precautions and know the location and how to use the eye washes, emergency showers, and fire extinguishing equipment.
5. If the unloading process is suspended, all valves and openings on the delivering container must be securely closed and disconnected from the unloading system.
6. Permanent truck loading/unloading platforms, ladders, or other fall protection are to be used for any work above ground level.
7. All product transfers must use connecting hoses, pipes, and/or couplings sufficiently tight to prevent workers or other persons from coming in contact with the product.
8. All hoses, piping, and tanks used in connection with product shall be rated for the pressure and vacuum conditions to be encountered.

### Procedures

The facility should use the below example to create site-specific procedures. Format and content will vary according to site needs.

2. Spot tank truck on a loading/unloading containment pad. Secure ignition key or placard windshield with a notice to prevent movement of truck during unloading. Set up “No Smoking” signs in area and any required traffic barricades. No smoking is permitted within 50 feet of the tank truck.
3. Chock wheels, set brakes, and **connect grounding and bonding cables, if required.**
4. Inspect truck, check flanges, piping, and valves for tight seal. Visually check truck for other hazards.
5. Verify truck contents (material and quantity) by the bill of lading and outlet tag. Inspect for intact seals and record seal number on full truckload shipments.
6. Attach the Corteva Agriscience supplied bulk tank labels per the “Bulk Tank Label Requirements” section of this guide. **Verify bulk tank has the current label and the correct product producer EPA Establishment Number.**
7. Check and record receiving tank contents and initial level. With tank gauging charts and truck papers, **verify that the tank will contain contents of the full truck (or compartment) contents without overflow and maintain at least a 10% headspace.** Confirm the truck unloading line is dedicated and in good condition (no external cracks). Verify that the unloading line is labeled and goes to the proper tank. The manway cover should be closed and secured during the initial phase of offloading to avoid splashing out of the manway.

8. Open vent line on the truck or open the hatch to permit in-breathing while unloading. There may be a vapor release. If the hatch is to be used for venting, first loosen to release pressure differential before fully unfastening the hatch cover. Do not leave the cover wide open. A wood block (about 1" thick) may be used to hold the hatch cover open for venting.
9. Examine fittings and gaskets on the truck unloading hose. Connect unloading hose between truck connection and pump suction connection.
10. Open valves on truck and tank for transfer.
11. When truck is empty, elevate the hose and "walk" it toward the pump suction, and pump the hose dry. Close liquid line valves, starting from the truck toward the bulk tank. Shut down the transfer pump.
12. Disconnect the transfer hose from the truck.
13. Check that the volume increase in the bulk tank is equal to the billed truck contents.
14. Cap or plug all connections on the bulk tank, hose, and truck. Stow the transfer hose.
15. Remove wheel chocks, ground cable, signs, barricades, and windshield placard. Return ignition key or remove placard and release truck for departure.
16. **Verify bulk tank has the current label, the correct product producer EPA Establishment Number, and record Net Contents on the Storage Label.**

## Bulk Tank Mixing

Bulk products must be circulated if they require re-suspension of suspended solids, or they have product which has fallen out of solution and crystallized. Mixing suspension products generally requires an internal eductor or nozzle for better product homogenization. Re-dissolving crystals may not require an internal eductor, but it is recommended. Consult your equipment vendor for specific design advice.

Avoid air entrapment or changes in physical properties of the product.

1. Do not use air to mix tank contents.
2. Do not free-fall product during loading or use mixing that results in significant splashing.
3. Keep ports and vents closed to avoid moisture loss.

Consult the product Supplements for product-specific mixing requirements.

## General Guidance

Product	General Mixing Comments
Suspensions	<p>Suspension products vary significantly in their tendency to separate or stratify, but most will do so eventually.</p> <p>Some water-based suspensions can increase in viscosity if product is allowed to dry out, sit without mixing, or be exposed to extended heat. Shearing the product with a pump may reduce viscosity of thickened product. Sit the tank, if possible, in the shade or indoors to avoid extreme heat.</p> <p>Follow product specific supplemental instructions whether to mix monthly or</p>

	just before the use season. Some products can only be mixed thoroughly when warmer than 50° F.
Emulsifiable Concentrates	Some emulsifiable concentrate products may crystallize below the minimum storage temperature. Maintain adequate storage temperature and circulation requirements according to product-specific supplemental instructions. In general, dissolving crystals works better with warmer temperatures.

Corteva recommends installing circulation capability for new tanks as good practice for potential future tank use.

### Other Mixing Recommendations

1. Direct the primary eductor or nozzle across the tank 45° off centerline and at a 45° downward angle.
2. Add a second eductor/nozzle pointed 45° up for large tanks. Alternate flow between the two eductors. However, do not use the upper nozzle/eductor if liquid level is low enough to allow splashing.
3. Keep the suction line to the pump short and at least 2" diameter to avoid priming problems.

## PORTABLE REFILLABLE CONTAINER (PRC) HANDLING

### General Requirements & Recommendations

The federal EPA requires each registrant to provide a description of acceptable portable refillable containers (PRCs). Refer to Appendix A for Corteva acceptable PRCs. Refillable containers include mini-bulks, Intermediate Bulk Containers (IBCs), drums and other containers which are refilled with pesticides.

### Requirements

1. Ag Retailer must comply with all federal, state, and local rules, regulations and standards regarding the handling of Corteva Agriscience products.
2. A valid EPA Establishment Number must exist for each location where the product will be repackaged.
3. A current Corteva Agriscience Repackaging Agreement which is a written authorization to repackage Corteva Agriscience product must be in place unless the site is 100% custom application.
4. Repackaging must comply with the Corteva Agriscience repackaging agreement.
5. Containers must meet applicable state and federal requirements. Only refillable containers with a capacity greater than > 55 gallons are to be used unless specifically allowed by Repackaging Agreement.
6. PRCs must be compatible with the product and be allowed by DOT and NFPA regulations. Consult

product-specific Guide Supplements for specific product requirements regarding materials of construction.

7. PRCs must meet DOT Packing Group III requirements. The PRC must be inspected, tested, and marked with the UN/DOT markings. There are exceptions, including for N-Serve® nitrogen stabilizer, which may use non-DOT specification stainless steel containers which comply with other requirements listed here. These inspections, tests, marking, and documentation are the responsibility of the packager or repackager; however, no shipper may offer any container for transport if it is not in compliance with regulations. See the DOT Transport Regulations section and the MSDS for more information. Learn more at [www.epa.gov](http://www.epa.gov)
8. PRCs must be marked with a serial number, or some other unique identifying code.
9. Liquid connections for refillable containers must comply with the product label, DOT and EPA requirements. The EPA Pesticide Container and Containment Rule requires a one-way check valve or tamper evident device on each opening other than the vent on refillable containers. Consult product-specific Supplements for specific product requirements.

Note: Top fill and withdrawal via a Micro Matic Drum Valve is the most common method of compliance with need for dry breaks in refillable containers.

10. Container venting for DOT regulated products must comply with DOT regulations. Non-regulated product tanks may use manual relief vents to relieve pressure and to permit pumping product from the container.
11. PRCs must be either dedicated or thoroughly cleaned prior to refilling according to applicable laws and regulations and the written instructions provided in Appendix B of this guide.
12. Each refillable container must be inspected by the Repackager prior to filling with Corteva Agriscience product to assure it meets the necessary criteria with respect to DOT retest and inspection requirements (49 CFR 180.352), continued container integrity, required markings, and openings. Inspection will also verify it is clean and free of contaminants (including water). If contaminants are present, or the tamper evidence is broken or missing, or the PRC is being rededicated to a different product, the container must be cleaned. See Appendix B for proper cleaning procedure.
13. Certified weigh scales or certified meters are used for filling containers intended for retail sale. Document the calibration as required by state and local regulations.
14. Filling and cleaning of refillable containers must take place on a rigid, liquid-tight containment pad.
15. Refillable containers should be stored within a containment area and must be if required by state or local regulations.
16. Tank filling system must be dedicated or have written rededication procedures in place.
17. 40 CFR 165.27 outlines recording keeping requirements for repacking facilities. These include details on the product you received; repackaging recordkeeping requirements include registration number of product, date of repackaging, and the serial number or other identifying container code. Report these records to the EPA annually on the appropriate forms and maintain repacking records for three years.



## DOT Transport Regulations

Each shipper and carrier is required to know whether a product is regulated by U.S. Department of Transportation (DOT). If the product is regulated for transport by DOT, each shipper and carrier is required to assure that

- each package is UN and/or DOT approved,
- the proper shipping papers are prepared,
- packages are marked and labeled appropriately, and
- the vehicle is properly marked or placarded.

**The Hazardous Material Shipping Description** is listed in section 14, “Transport Information”, of the SDS. Because shipping descriptions may change from time to time, refer to the current SDS for each product. Consult the Code of Federal Regulations Title 49, Parts 100-180.

**PRC Inspection and Testing:** Containers cannot be filled when the test & inspection date marked on the container is past due, unless they are inspected, retested, marked, and documented in accordance with the DOT rules for Packing Group III or higher, as appropriate for the container. In general, this will include

- a. Visual Inspection – before being filled.
- b. Leakproof Testing – every 2.5 years.
- c. External Visual Inspection – every 2.5 years.
- d. Internal Inspection – every 5 years.

Note: see 49 CFR 180.352 for more detailed requirements regarding IBC periodic retest & inspection protocol.

**Air and Vessel Shipments:** Some DOT regulated products are specifically prohibited from air or vessel shipments. Corteva Agriscience recommends avoiding air shipments even where it is allowed. Consult DOT experts and/or the SDS before shipping by air or vessel.

## EPA Repackaging Requirements and Refillable Labeling

**Each refillable container must have the following:**

- Product label provided by Corteva Agriscience,
- The proper EPA Establishment Number of the refiller and Net Contents noted on the label, and
- DOT marking, labeling, and/or placarding as required.

Corteva Agriscience will make available the product label and DOT labeling through the label ordering web site, (<https://powertopromote.worksmartsuite.com/UserContentStart.aspx>), or contact your sales representative or Corteva at 1-800-258-3033 to obtain an additional bulk tank label packet. Corteva Agriscience does not provide truck or cargo tank placarding that may be required by DOT.

### Refillable Container Label Instructions

1. Remove old labels BEFORE affixing the new label to the refillable container.
2. Securely affix the product label onto the container.
3. Write the **net contents** and **Refiller’s EPA Establishment Number** on the label.

4. Add DOT labels as required.

## Net Contents and EPA Establishment Number

EPA requires that net contents in the tank at the time of last shipment be recorded on the tank. This number need not be changed as product is withdrawn unless required by state law.

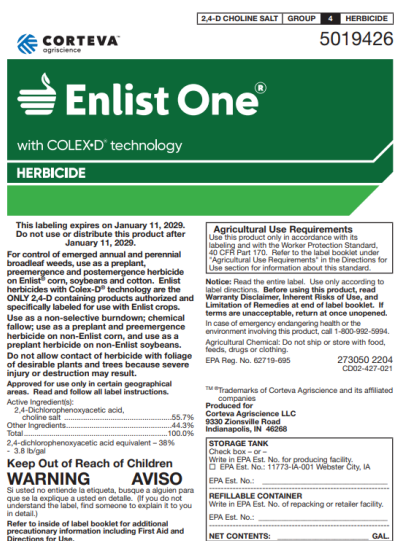
**For bulk storage tanks, check or write the EPA Establishment Number of the producing facility, on the product label. For refillable containers, write in the EPA Establishment Number of the repacking or refilling facility, on the product label.**

## Example Label

The Corteva Agriscience product label incorporates a product booklet and tank label in a single, adhesive backed design.

### Product Label / Booklet (Example Only)

**DOT Labels (2,4-D Salt Example Only for single pack sizes > 92 kg (211 lbs) (see 49 CFR, 172.514(c)(4)))**



**ENVIRONMENTALLY HAZARDOUS  
SUBSTANCE, LIQUID, N.O.S.  
(2,4-D CHOLINE SALT) RQ (2,4-D CHOLINE SALT)  
UN3082**



## Refillable Container Mixing

Most Corteva Agriscience products do not require mixing while in a refillable container. General good practices include:

1. Do not use air to mix tank contents as it may cause air entrapment or changes in physical characteristics of the product.
2. Keep ports and vents closed to avoid moisture loss.
3. Avoid mixing that causes splashing of the liquid to prevent air entrainment.

Product	General Mixing Comments
<b>Suspensions:</b>	The solid particles of any suspension formulation have the potential to settle over time. The amount of settling and difficulty of re-suspension depends on the characteristics of the particular formulation. Also, suspensions tend to be higher

	viscosity than other formulations. In general, circulating when the product is warmer helps.
<b>Emulsifiable Concentrates (ECs)</b>	ECs generally do not require circulation. Some products have the potential to form crystals if stored below the minimum storage temperature, or if solvent is allowed to evaporate. In general, if crystallization occurs, place the container in a warm area (sunlight or heated storage), then circulate the product until crystals are dissolved.

**Specific Product Requirements:** Refer to the product-specific Supplement to this Guide.

## General Recommendations

1. Where allowed at all, polyethylene refillable containers greater than 5 years old are not recommended. Polyethylene refillable containers should be free of cracks, UV degradation or other signs or aging or structural defects. Corteva Agriscience shall bear no risk or liability associated with the use of polyethylene containers.
2. Use grounding cables during product transfers of products with flash points below 110 °F. Cables are required for products below 100 °F or where temperatures are above the product flash point.

Several container systems vendors for most Corteva Agriscience products are listed in Reference section at the end of this document.

## ENVIRONMENTAL & EMERGENCY INFORMATION

### Environmental Fate and Wildlife Toxicity

Each product label and SDS lists toxicity to birds, fish, and other wildlife, along with restrictions on application area.

### Fire, Spills, and Clean-Up

The following procedures are intended primarily for immediate, temporary control of emergencies. Call Corteva Agriscience Emergency Response at 1-800-992-5994 to obtain advice and arrange for professional help, as needed, to assist with an emergency.

Plans should be made for minor and major emergencies, including injuries, personnel exposures, spills, vapor releases, and fires. Emergency procedures should be in writing and regularly reviewed with personnel.

Emergency plans must be reviewed with local emergency services groups. These plans must include locations and amounts of product and other hazardous substances per the SARA Title II Emergency Planning and Community Right to Know Act.

The product SDS provides recommended extinguishing media, firefighting instructions and information such as flash point and flammability limits. The SDS also contains information about controlling and cleaning up spills. An SDS for each product must be available on site and should be shared with local emergency responders.

A stock of emergency supplies, including personal protective equipment, absorbent materials, and disposal drums should be kept on hand. Disposal drums can be purchased from most drum suppliers

or safety supply houses. The disposal drum should be DOT approved for wastes as required by law. Warehouses should stock several of these drums and clearly mark them as “Disposal for Pesticides.”

## Fire

1. **Notify Emergency Responders.** If appropriate, immediately notify local police, fire department, and Corteva Agriscience Emergency Response at 1-800-992-5994, Option 2, from a safe distance to the fire. Identify all products that might be involved. Have SDSs ready when fire-fighters arrive.
2. **Evacuate the Area:** Move all personnel from the immediate area to a safe distance, upwind from the smoke and fumes. Reroute traffic if necessary.
3. **Use Full Turn-out Gear:** Unless otherwise instructed in the SDS, fire fighters should wear full turnout clothing including heavy rubber boots, chemical-resistant gloves, and positive-pressure, self-contained breathing apparatus for protection against both toxic fumes and oxygen-deficient atmospheres.  
**Caution:** Respirator cartridges or canisters commonly used for protection against pesticides offer limited protection against vapors with no protection against oxygen deficiency and should not be used in firefighting.
4. **Use Fire-Fighting Techniques as Specified in the SDS.** Usually, this will include standard techniques and equipment to combat the fire (water, spray, foam, etc.).
5. **Limit Fire Spread:** Keep containers of unaffected product cool, if possible, with a water spray.
6. **Limit Water Use and Control Run-Off:** Use only as much water as necessary because excess water compounds contamination and cleanup issues. Dike or trench around the area to keep contaminated water from reaching streams, water supplies, and sanitary or storm sewers.

## Spills

1. **Notify Emergency Responders.** If appropriate, immediately notify local police, fire department, and Corteva Agriscience Emergency Response at 1-800-992-5994, Option 2, from a safe distance to the spill.
2. **Wear Personal Protective Equipment (PPE).** Depending on the product and size of the spill, chemical suits and positive-pressure, self-contained breathing apparatus (SCBA) may be required. Consult the SDS for PPE requirements in areas with high concentrations of vapor and product.
3. **Isolate the Area:** Keep upwind and isolate the contaminated area and keep unnecessary personnel away using barricades or other means. Stop road traffic if necessary. Indoor spills may require evacuating and ventilating the area to minimize vapor concentrations.
4. **Control Fire Hazards:** Check the product flash point on the SDS to confirm if flammable vapors might be present. If so, extinguishing all flames, shut off all spark-producing equipment; prevent anyone from smoking, and only allow persons with spark-proof footwear in the area. Use care not to create sparks with hand tools.
5. **Treat any Exposures:** If anyone has been exposed to the products, render first aid according to the SDS or “Personal Safety” section of this Guide. If possible, remove affected people to fresh air immediately.
6. **Control the Spill at the Source.** Locate and stop the leak at the source. If it can be done safely, invert or reposition the leaking container so flow is reduced or stopped. If practical, put the leaking container into an over-pack.

7. **Contain the Spill:** Prevent product from entering public sewers, ditches, ponds, or waterways. Use absorbent pillows, dams, ditches or dikes to stop the flow and minimize the spread of contamination.

If the spill is large, and occurs inside secondary containment, collect the product and recover it if possible. Leaking vehicles may be moved to containment if the move does not spread the contamination. DO NOT START THE ENGINE if flammable vapors may be present. For smaller spills which cannot be recovered, apply a suitable absorbent material (diatomaceous earth, sand, clay, sawdust, etc.) onto the spill.

8. **Clean Up and Decontaminate.** Areas or equipment where spills or leaks have occurred must be cleaned and decontaminated as soon as practical.

Undamaged containers may be removed after washing the exterior of any contamination. Remaining product from leaking containers may be transferred to clean containers if caution is used not to ignite any flammable vapors.

Contaminated equipment may be washed with water and detergent, then rinsed. Collect rinsate for later disposal. Absorbent materials such as wood may need to be removed and incinerated or disposed according to federal, state, and local regulations.

Collect the spill clean-up material and any contaminated soil and place into disposal containers. Secure the lids and label the container with the contents. Flush or clean the contaminated areas, containing and collecting the rinsate. Do not allow the water to run off to the ground, sewers or waterways.

Follow federal, state, and local laws and regulations in determining the appropriate method of handling, storing, and disposing of the rinsates and wastes.

9. **Report the Spill to Proper Authorities.** If the spill reaches or threatens to reach a stream, body of water, water supply, or area that might lead to a water supply, notify local health department authorities, the EPA, and/or Coast Guard immediately.

When the immediate threat is mitigated, determine whether the spill or release triggered a notification and/or reporting requirement under federal, state, or local laws and/or regulations. Reporting or notification is required if a release equals or exceeds the Reportable Quantity (RQ) for the chemical released. See the CERCLA/ SARA Reportable Quantities table at the end of this section for product RQs. Note that individual state and local RQs may differ from the CERCLA/SARA RQs.

In addition, you may choose or be required to notify the local fire department, local health department, the state environmental management agency, and the state agricultural office. It is also advisable to notify INFOTRAC at 1-800-992-5994, Option 2. INFOTRAC will provide initial product emergency information and route you to the Corteva Agriscience Emergency Response Team for additional information. Adverse effects to people or environment resulting from the spill must also be reported to satisfy the FIFRA § 6(a)(2) adverse effects reporting requirements (see below).

Complete appropriate initial phone calls as soon as possible. Follow up with a written report if required.

10. **Properly Dispose of the Spill Clean-Up Material.** Contact your local, state and federal

environmental authorities to determine the regulatory requirements for the proper disposal of the spill clean-up material.

## **CERCLA Reportable Quantities (RQ) and SARA Listing**

Releases in excess of the CERCLA reportable quantity must be reported to the National Response Center (1-800-424-8802) and to the appropriate state and local emergency response organizations. Note that individual state and local RQ's may differ from the CERCLA RQ's.

“SARA Listed Components” are substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372 as of the date of publication of this Guide.

The CERCLA RQ are shown in 40 CFR Part 302.

Note: CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act  
SARA = Superfund Amendments and Reauthorization Act

## **FIFRA § 6(a)(2) Adverse Effects Reporting**

Section 6(a)(2) of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) states that if a registrant has information regarding unreasonable adverse effects to people or the environment of a pesticide, the registrant shall submit the information to the EPA.

EPA regulations require that Corteva Agriscience employees and agents be responsible for recognizing and reporting adverse effects. EPA considers agents to include not only employees, but also consultants, contract researchers, sub-registrants, and in some cases, retailers and distributors.

Distributors will inform Corteva in a timely manner of any alleged incident involving a Corteva product – in transportation, storage, or use – involving actual or potential injury to humans, wildlife, livestock, agricultural crops, or the environment for potential FIFRA 6(a)(2) reporting.

Adverse effects reporting deadlines are very short, so contact Corteva Agriscience at 1-800-992-5994 for more information immediately in the event of an incident. Reporting information or allegations is not an admission of liability.

## REFERENCES

---

### Bulk Facility Inspections & Assessments

#### *Retail Facility Checklist*

American Agronomic Stewardship Alliance (AASA).  
(309) 827-2774. <https://aginspect.com/>

#### *Security Vulnerability Assessment Tool*

Web-based tool for security assessment of retail facility and transportation practices. Sponsored by Agribusiness Security Working Group, comprised of Agricultural Retailers Association (ARA), CropLife America (CLA) and The Fertilizer Institute [TFI]) in cooperation with Asmark Inc. [www.aradc.org](http://www.aradc.org) or call ARA at (202) 457-0825

### Bulk Facility Planning & Operation

#### *Bulk Pesticide Rules with Acceptable Refillable Containers*

<https://bulkpesticiderules.org/>  
Industry guideline for refillable containers

#### *Designing Facilities for Pesticide and Fertilization Containment*. MWPS-37

Midwest Plan Services, Iowa State University  
Ames, IA 50011  
(515) 294-4337  
<https://store.extension.iastate.edu/product/2719>

#### *NFPA 30: Flammable and Combustible Liquids Code*

NFPA 70: National Electric Code  
National Fire Protection Association  
Quincy, MA 02269  
(800) 344-3555 [www.nfpa.org](http://www.nfpa.org)

#### *Environmental Handbook for Fertilizer and Agricultural Dealers*

[CAB Direct.org](http://CABDirect.org)

### Bulk and Repackaging Regulations

US EPA web site: <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-E/part-165/subpart-D>

Your state EPA, state chemist, agricultural or environmental departments.

*The Pesticide Stewardship Alliance (TPSA)*

<https://tpsalliance.org/>

### Department of Transportation (DOT)

See DOT regulations at [www.DOT.gov](http://www.DOT.gov)

Ag Container Recycling Council (ACRC)

<https://agrecycling.org>

### Bulk System Vendors (others may be used)

Chemical Containers Inc.

Lakes Wales, FL 33859-6848  
(800) 346-7867 [www.chemicalcontainers.com](http://www.chemicalcontainers.com)

FarmChem Corporation

Floyd, IA 50435  
(800) 247-1854; [www.farmchem.com](http://www.farmchem.com)

Murray Equipment Inc.

Fort Wayne, IN 46808  
(260) 484-0382; [www.murrayequipment.com](http://www.murrayequipment.com)

Westheffer Company

Lawrence, KS 66044  
(785) 843-1633. [www.westheffer.com](http://www.westheffer.com)

### Worker Protection

US EPA web site:

Occupational Pesticide Safety and Health  
<https://www.epa.gov/pesticide-worker-safety>

### Hazardous Waste

*How to Recognize A Hazardous Waste (even if it's wearing dark glasses)*

By Gary Crouth

### Learn the Basics of Hazardous Waste

U.S. EPA  
<https://www.epa.gov/hw/learn-basics-hazardous-waste>

## Emergency Response Information

For Corteva products, call 1-800-992-5994.

For non-Corteva products, call Emergency Phone Number provided on the Product Label or SDS.



® ™ Trademarks of Corteva Agriscience LLC and its affiliated companies

*NOTICE: The information, procedures, methods, and recommendations herein are presented in good faith and are believed to be accurate and reliable as of the publication date but may well be incomplete and/or not applicable to all conditions or situations. No representation, guarantee, or warranty is made as to the accuracy, reliability, or completeness of said information, procedures, methods, and recommendations. Nor is any representation, guarantee, or warranty made that application or use of any of the same will avoid hazards, accidents, losses, damages, or injury of any kind to persons or property, or give desired results, or that the same will not infringe patents of Corteva Agriscience™. Readers must satisfy themselves as to the suitability of said information, procedures, methods, and recommendations prior to use.*



## Appendix A

### Corteva™ Approved Portable Refillable Containers

Portable refillable containers must meet the acceptable requirements of the registrant. The following table, provided by the CropLife America: Industry Guideline for Acceptable Containers [website](#), illustrates Corteva approved containers.

	Category 1	Category 2	Category 3	Category 4	Category 5
Description:	Blow-molded inner container in cage or shell	Thick Wall container on a protective base or legs	Thick wall, Proprietary Design	One Piece Container	One Piece Container
Bottom Discharge	with or without bottom discharge	with or without bottom discharge	with or without bottom discharge	No bottom discharge	with or without bottom discharge
Cylindrical/Square	Square	Square or Cylindrical	Square/Cylindrical or Custom	Cylindrical	Square or Cylindrical
Stackable	Yes	Yes	Yes or No	Yes & No	Yes
Options		May have top chime. May be equipped with a pump.	May have top chime. May be equipped with a pump.	May have top and bottom chimes	
Materials	HDPE bottle & Metal cage	HDPE and LLDPE Plastic	HDPE and LLDPE Plastic	HDPE and LLDPE Plastic	Stainless Steel
UN / DOT Authorization	UN 31HA2	UN31H1, UN31H2,	UN1H1, UN3H1, UN31H1, UN31H2, None	UN1H1, UN3H1, UN31H1, UN31H2,	UN1A1, UN31A1, DOT 57
Containers in each category include, but are not limited to, those pictured here.					

## Appendix B

### Residue Removal Procedure for Portable Refillable Containers

In 49 CFR 165 Subpart D, the federal EPA requires each registrant to provide a residue removal procedure for portable refillable containers (PRCs). This document provides that procedure for PRCs intended for refilling with Corteva Agriscience products.

The facility should use this information to create site-specific cleaning procedures. Format and content will vary according to site needs and requirements but should include the elements below.

Any procedure must result in the following:

- No visible solids on the interior or exterior of the PRC.
- Residue limits below the EPA requirements in EPA PR Notice 96-8.
- Residue limits below Corteva Agriscience minimum requirements for product integrity.

#### Prior to Residue Removal

- Confirm and understand all disposal methods and costs before any cleaning operation begins. Segregation and use of cleaning rinsate as spray solution is preferred over disposal.
- Wear the proper protective equipment as required by the product SDS during inspection and cleaning.
- Perform all residue removal within secondary containment.

#### Procedures

1. Drain all liquid into a DOT approved disposal drum.
2. Remove any solid matter.
3. Close bottom drain if applicable and rinse inside walls with water. The use of a pressure washer is recommended
4. Drain and properly dispose of the wash water.
5. Inspect inside of container with flashlight.
6. Repeat washing procedure with hot water and detergent, and brush if residues remain.
7. Disassemble flanges, valves, pumps, meter, conservation vents, and other equipment on the tank if residues may be trapped. Replace all gaskets.
8. Rinse and circulate with clean water. Repeat this step until the water remains clean and residue free.
9. Drain interior of container, hose, meter, pump, etc., completely.
10. Dispose of residues and wash water in accordance with federal, state, and local laws and regulations.

#### Notes:

Using a solvent such as diesel fuel for products which are solvent based solutions of crystals may produce better results than water because the solvent will dissolve crystals. Pay special attention to the top interior of the PRC. This area is usually the most difficult to clean.