

StareDown® Herbicide

Supplement to Bulk Storage and Handling Guide

This product-specific information supplements the Corteva Agriscience™ “Bulk Storage and Handling Guide”. Use these documents together to understand the requirements for a bulk storage facility of this product. To obtain additional copies of this Bulk Storage & Handling Guide, or this product-specific Supplement, see <https://www.corteva.us/Resources/Bulk-Storage-and-Handling-Guides.html> or contact your Corteva Territory Manager or Sales Representative.

General Storage Comments

- StareDown® Herbicide is an EC (emulsifiable concentrate) formulation.
- If it is the first time StareDown Herbicide is added into a bulk tank which was previously used for a different product, it is critical that the tank is cleaned thoroughly prior to the addition of StareDown Herbicide using the protocol on “Bulk Product Tank Cleaning” section of this document.
- After each delivery and prior to first in-season use, the product should be recirculated long enough to provide a minimum of 3 tank turns in the bulk tank. In addition, when held in a bulk tank during the use season, recirculate the product every 60 days. Recirculation should be long enough to provide a minimum of 3 tank turns in the bulk tank. For example: 10,000 gallons of product stored in a tank with a recirculation pump with a capacity of 100 gallons/minute (~6,000 gallons/hour), would require roughly 5 hours of recirculation.
- The use of jet mixers within the tank is also highly recommended to increase the mixing capabilities of the recirculation system. Avoid air entrapment into the product as this can cause difficulties in handling.
- If using a filter assembly while recirculating the product or pumping it off to intermediate bulk containers (IBC) or totes, use a filter screen that is 12 mesh or coarser.
- StareDown Herbicide must be stored at temperatures greater than 40°F. When stored at temperatures below 40°F there is a risk of crystallization. If this crystallization does occur, product temperature must be raised to 60-70°F to allow for all crystals to dissolve. This dissolution may happen slowly. After, the tank can then be recirculated to ensure the product is homogenous. A minimum of 3 tank turns should be used.
- Out-of-season storage, StareDown Herbicide should be a homogenous product. Prior to mixing the tank for the first time after cold-season storage, make sure there are no visible crystals or solid-like materials in the product, otherwise pump damage may occur.

Product Density vs. Temperature

Temperature °F (°C)	32 (0)	40 (4.4)	50 (10)	60 (15.6)	70 (21.1)	80 (26.7)	90 (32.2)	104 (40)
Density (lb/gal)	8.906	8.875	8.836	8.798	8.759	8.720	8.681	8.627

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

Flash Point ¹ °F (°C)	NFPA 704 Diamond Ratings			Min. Storage Temperature °F (°C)	EPA Signal Word
	Health	Flammability	Reactivity		
>212 °F (100 °C)	1	1	1	10°F (-12°C)	Warning

Material / Product Compatibility	Rating	Comment
Stainless Steel (304L, 316L)	OK	Required for bulk tanks.
Aluminum	OK	Acceptable for tank materials of construction.
Brass, Carbon Steel, and Copper	Conditional	Materials not recommended for bulk tanks but may be acceptable for temporary use. Regularly inspect for material changes and/or degradation. Replace as needed.

¹ The flash point of a liquid is the minimum temperature at which it gives off sufficient vapor to form an ignitable mixture with the air near the surface of the liquid or within the test vessel used.

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EPDM, Kalrez 6375, Silicone, and Teflon	OK	Recommended for gaskets and seals; including hose lining.
Butyl Rubber, NBR, Neoprene, SBR, Nitrile, Polyurethane, and Viton	NO	Will likely absorb product and lose strength. Swelling or disintegration is possible.
HDPE, FEP, PFA, Polypropylene, and PTFE	OK	Acceptable for materials of construction.
Nylon, PVC, Tygon, PET, ABS	NO	Moderate to severe degradation.

Bulk Tank Material of Construction and Requirements

Material of Construction	Stainless steel is recommended. If State and Local laws permit, existing poly storage tanks (high density) may be utilized if the tank is free of cracks, UV degradation, or other signs of aging or structural defects for no more than one month. Carbon Steel and Aluminum tanks are acceptable, there is slight corrosivity in carbon steel (0.1 mpy).
Venting Requirement	Normal venting outside of building is required.
Couplers	Standard 2" Kamlok Style Adapter with cap for receiving bulk deliveries.
Mixing Requirement	See mixing requirements in "General Storage Comments" section.
Piping and Rubber Tubing	Stainless steel piping is the recommended standard. IMPORTANT INFORMATION: The use of automotive style heater hose as a portion or all the plumbing on a storage tank is strictly FORBIDDEN. If rubber tubing must be used as a portion of the plumbing, the rubber tubing MUST be lined with acceptable material (like Teflon or HDPE). When using lined tubing, extreme caution must be used to ensure the lining material fully contacts any metal tubing barbs. Failure to ensure the lining materials contact the metal fittings will result in a failure of the tubing at the fitting. All lined tubing used within a bulk system MUST be inspected prior to each use of the system to make sure the rubber hose has not swelled or softened from exposure to the product.

Refillable Container Handling

DOT/EPA	This product is not-regulated by the US Department of Transportation. Containers must meet EPA Pesticide Container and Containment Rule requirements. Use UN/DOT approved containers. See Corteva Agriscience bulk storage and handling guide at https://www.corteva.us/Resources/Bulk-Storage-and-Handling-Guides.html for additional general requirements.
Material of Construction	Clean polyethylene (high density) and stainless steel are acceptable. Inspect each container for cracks, discoloration, or signs of structural flaws prior to each use.
Mixing	StareDown® Herbicide should be mixed well just prior to the use season and the first use of the tote. Containers with built-in circulation are the best and are preferred. Both over-the-top mixing and bottom-to-top recirculation systems are acceptable.
Couplers	Standard couplers are acceptable.
Piping/Rubber tubing	Rubber tubing MUST be lined with either Teflon or HDPE (high density polypropylene). When using lined tubing, extreme caution must be used to ensure the lining material fully contacts any metal tubing barbs. Failure to ensure that the lining materials contact the metal fittings will result in a failure of the tubing at the fitting. All lined tubing used within a bulk system MUST be inspected prior to each use of the system to make sure the rubber hose has not swelled or softened from exposure to the product.
Seals, gaskets, and hose lining	Recommend EPDM, Silicone or Teflon (PTFE)

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Bulk Product Tank Cleaning

Procedure:

1. Completely drain the tank
2. Visually inspect the tank interior and remove any loose solid material
3. A typical high-pressure washer is recommended for cleaning as they are efficient, and they generate (2-5 gpm) minimal wastewater.
4. Using ambient temperature water or ambient caustic solution, spray bottom first with water to loosen any residue in the sump or cone.
5. Continue pressure wash under roof shell, then inside wall of tank, working from top of the walls down.
6. If possible, circulate rinse water for 10 minutes in the tank and piping. (Add water volume as needed to avoid starving the pump).
7. Completely drain the tank using the system pump, preferably exiting through the meter.
8. Repeat steps 4-7 two more times.
9. Wastewater from cleaning the tanks must be collected and used or disposed following Federal, State, and Local regulations and guidelines.
10. After cleaning, inspect the tank for signs of corrosion or pitting on interior surfaces and welds. Inspect pump, pipes, hoses, and fittings for fitness of purpose.
11. Document cleaning and inspection.

Corteva requires a new Tank Inspection Form (TIF) confirming the tank is clean and was inspected prior to switching to a new Corteva product.

Always wear proper PPE as recommended on the product's Safety Data Sheet (SDS) during inspection and cleaning.

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™. Corteva Agriscience disclaims all liability caused by or in relation to the storage of products contemplated hereunder or otherwise other than as explicitly set forth in the product label or as required by applicable law. Always follow the applicable product label, SDS, and all applicable laws and regulations. Readers must satisfy themselves as to the suitability of said information, procedures, methods, and recommendations prior to use.

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