

Personal Protection Equipment and Paraquat



(Tharp, 2004)

The use of highly toxic pesticides that require respiratory protection were on the decline for over two decades; however one highly toxic active ingredient has been on the rise due to glyphosate resistant kochia in Montana. This active ingredient known as paraquat is in such formulations as Blanco[®], Drexel Quik-Quat[®], Devour[®], Firestorm[®], Helmquat 3SL[®], Gramaxone Inteon[®], Gramoxone SL[®], Cyclone SL 2.0[®], Bonedry[®], Willowood Paraquat 3SL[®], Paraquat Concentrate[®] and Para-Shot 3.0[®]. Paraquat is a photosynthesis inhibitor and acts as a non-selective contact herbicide.

Applicators are reminded to use this pesticide product with care as it is classified as a category 1 substance with the signal word ‘Danger – Poison’. This signal word implies that this pesticide product is highly toxic through multiple routes of entry. When using paraquat products applicators should remember to:

- 1) Have buffers between the pesticide application and sensitive areas (livestock, people, pets).
- 2) Follow all re-entry requirements on the pesticide product label.
- 3) Wear proper personal protective equipment.

Personal Protective Equipment

Personal protective equipment (PPE) requirements are usually on the first or second page of the product label under Precautionary Statements. Table 1 represents the PPE requirements for applicators when using the paraquat formulation known as Paraquat Concentrate[®]. PPE requirements for applicators not mixing and loading include protective eyewear, long sleeve shirt and pants, protective eyewear, chemically resistant gloves and the use of a NIOSH approved particulate filtering respirator with any N, R or P filter with an approval prefix of TC-84A. Mixers and loaders must also wear a chemical resistant apron and face shield (Table 1).

Table 1. Personal protective equipment requirements for Paraquat Concentrate.

Applicators and other handlers (other than mixers and loaders) must wear:

Long-sleeved shirt and long pants; Chemical resistant gloves – Category A (e.g., barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinyl chloride (PVC) or viton); Shoes plus socks; Protective eyewear; NIOSH-approved particulate filtering respirator equipped with N, R or P class filter media. The respirator should have a NIOSH approval number prefix TC-84A. It is recommended that you require that respirator wearer to be fit tested, and trained in the use, maintenance and limitations of the respirator.

Mixers and loaders must wear:

Long-sleeved shirt and long pants
 Chemical resistant gloves – Category A (e.g., barrier laminate, butyl rubber, nitrile rubber, neoprene rubber, natural rubber, polyethylene, polyvinyl chloride (PVC) or viton)
 Shoes plus socks
 Chemical resistant apron
 Face shield
 NIOSH-approved particulate filtering respirator equipped with N, R or P class filter media. The respirator should have a NIOSH approval number prefix TC-84A. It is recommended that you require that respirator wearer to be fit tested, and trained in the use, maintenance and limitations of the respirator.

Respirator requirements can be quite confusing due to the wide variety of respirators on the market. Some product labels contain designations such as TC-84A, TC-21A, TC-23C, TC-14G, TC-13F and TC-19C (Table 2). The product label for Paraquat Concentrate® calls for a TC-84A respirator. TC-84A respirators include:

#1 Filtering face-piece respirator (N, R, or P)



#2 Air Purifying Respirator (APR) with particulate filters (N, R or P)



#3 Air Purifying Respirator (APR) with combo chemical cartridge and filter (N, R or P filter)



TABLE 2. NIOSH DESIGNATIONS	
TC – 84A	Filtering face-piece respirator (N, R or P) Air purifying respirator with particulate filters (N, R or P) Air purifying respirator with combination chem cartridge and filter (N, R or P)
TC – 21C	Powered air-purifying respirator with particulate filter (HE)
TC – 23C	Air purifying respirator with chemical cartridges Powered air purifying respirator with chemical cartridges Powered air purifying respirator with combination chemical cartridge & filter (HE)
TC – 14G	Gas mask with or without particulate filter (N, R or P) Tight-fitting powered air purifying respirator w/ gas canister with/without HE filter
TC – 13F	Self-contained breathing apparatus Supplied-air respirator with a self-contained escape bottle
TC – 19C	Supplied-air respirator

Types of Filters and Cartridges. The ‘Paraquat Concentrate[®]’ product label also calls for the use of particulate filters rated as N (**NOT** resistant to oil), R (**RESISTANT** to oil) or P (oil **PROOF**). Filter efficiency is rated as 95, 99 or 100. For example you could have a label that specifies N, R or P filters with an efficiency rating of 100. This is referring to N100, R100 or P100 filters for your respirator. The product label for ‘Paraquat Concentrate[®]’ allows for the use of any N, R or P filter.

Chemical cartridges remove gases and vapors but they don’t remove particulates. The most common cartridge or canister required on the product label remove organic vapors (OV). Chemical cartridges should be changed if you detect chemical odors while wearing respirator. The Paraquat Concentrate product label does not require the use of a chemical cartridge.

Fit Testing. Applicators using a pesticide product: 1) with an Agricultural Use Requirements box on the pesticide label and 2) on an agricultural commodity, must comply with the new 2015 Worker Protection Standard (WPS) requirements. According to the 2015 WPS requirements pesticide applicators (handlers) required to use respirators must pass a fitness exam by a qualified medical doctor and pass a qualitative or quantitative fit test prior to wearing qualifying respirators. Applicators should fill out and bring the fitness questionnaire to a qualified medical doctor to review. This questionnaire is available at <http://www.pesticides.montana.edu/wps/respirators.html> by selecting “Medical Evaluation Questionnaire”. If the medical provider approves the use of the respiratory equipment then applicators must pass a qualitative or quantitative fit test to assess the proper fit and size of respirators. Some fit testing centers across Montana are viewable online at

<http://www.pesticides.montana.edu/wps/respirators.html>. It should be noted that fit testing and seal testing are not the same procedure. Upon passing a fit test applicators can conduct the pesticide application wearing the proper respiratory equipment; however each time an applicator uses the respiratory equipment they should perform a negative pressure seal test by covering the surface or hose where air is inhaled and breathe in. If the mask is properly sealed, it should collapse on face with no signs of leakage. Re-adjust mask until you get a seal or purchase a mask of a more appropriate size.

***WPS respiratory requirements described in this article are not all inclusive. Applicators should be aware of the full WPS respiratory requirements as defined in 29 CFR 1910.134 at <https://www.osha.gov/Publications/3352-APF-respirators.html>**

For More Information

For more information on respirators see the CDC NIOSH requirements at <http://www.cdc.gov/niosh/docs/96-101/> or see pages 96 – 100 of the national pesticide applicator core manual at <http://www.nasda.org/File.aspx?id=30515>. For full WPS requirements navigate to <http://www.pesticides.montana.edu/wps/index.html>. For other questions contact Dr. Cecil Tharp (MSU Pesticide Education Coordinator; 406-994-5067; ctharp@montana.edu).