Department of Pesticide Regulation

Brian R. Leahy
Director

Edmund G. Brown Jr.
Governor

April 8, 2015

TO: Agricultural Film Manufacturers

SUBJECT: TARPAULINS USED FOR CHLOROPICRIN PERMIT CONDITIONS

This letter is to inform you about the Department of Pesticide Regulation's (DPR) intent to develop a California-specific approved tarp list for tarps that would receive a 60 percent buffer zone reduction credit for field fumigations of chloropicrin. The U.S. Environmental Protection Agency (U.S.EPA) chloropicrin soil fumigant labels include safety provisions that require buffer zones and other related measures. The chloropicrin labels include credits for certain tarps to reduce buffer zone distances. The U.S.EPA has maintained a list that allows the reduction of buffer zone distances of 20 to 60 percent with the use of certain tarps. These credits were defined by the U.S. EPA using both field study and laboratory-based data. Part of the laboratory data were the results of tests measuring the mass transfer coefficient (MTC) of several types of tarps under certain laboratory conditions, such as ambient humidity levels. These data were used to create EPA's tarp list. MTC values are essentially a measure of permeability of the tarp when challenged by individual fumigants. For California, DPR has determined that there was insufficient data to allow reductions in chloropicrin buffer zone distances for tarps that U.S.EPA designated to receive 20 percent or 40 percent reductions on the label buffer zone tables. Therefore, DPR's will only give buffer zone credit for those high barrier tarps that qualify for the 60 percent reduction. DPR's evaluation of the data for the tarps given the 60 percent credit show they are effective in reducing emissions significantly.

The need for a California-specific tarp list that qualifies for the 60% credit arises from the fact that best management practices and labels require fields to be fumigated at soil moisture content high enough to control the movement of the fumigants out of the soil, creating conditions of high humidity under the tarps. DPR and others have concerns about the performance of some tarps on EPA's list assigned 60% buffer credit at high humidity (Qian, et al. 2011). Based on this condition, DPR determined that data is needed to confirm whether tarps provide similar protection during high humidity conditions. Therefore, DPR will be creating their own list of tarps that retain their retention capabilities under conditions of high humidity from those listed on the U.S. EPA 60% buffer zone reduction credit tarp list.

Tarps must be currently listed on the U.S. EPA 60% buffer zone reduction credit list to be considered for the DPR California-specific list, or tarp MTC test results must be submitted concurrently to U.S. EPA and DPR. All tarps on the U.S. EPA 60% buffer zone reduction credit list must submit results for a high humidity test to be considered for DPR's California–specific list. Only laboratory results from a test conducted from January 2014 forward will be considered.

To be included in the DPR's California-specific 60% buffer zone reduction credit list to be generated in December 2015, you must submit a tarp sample to a qualified lab by May 15, 2015 and notify DPR of the submittal. Notification should include the date the tarp sample was submitted and the laboratory conducting the permeability test, with the identification of the tarp. Notification can be through an email or letter to:

Pam Wofford
Environmental Monitoring Branch
Department of Pesticide Regulation
1001 I Street
Sacramento, CA 95814
Pam.Wofford@cdpr.ca.gov

DPR will send confirmation that it has received the notice. Once submitted, the identification information for the tarp must remain the same. Any name change, composition or manufacturing process change may require a new permeability test. A tarp sample must be retained by the manufacturer for each tarp submitted. The analysis must follow ASTM method E2945 (ASTM, 2014) and criteria listed in the attached document. Tarps that have the same identification (same name and construction) but vary in colors may submit only one tarp sample for analysis that will apply to all of the tarps under the same identifying name. Only a single tarp thickness needs to be submitted for testing. DPR will also approve tarps with greater thickness of the same construction.

Results of the laboratory permeability tests must be submitted by the tarp manufacturer upon receipt from the laboratory, not by the laboratory. Once DPR has received, reviewed, and evaluated the permeability data conducted under high humidity, they will create a list of tarps that will be eligible for a 60% buffer zone reduction credit for chloropicrin field fumigations in California. Manufacturers will receive a notice from DPR after its evaluation of the data submitted for each tarp as to whether or not the tarp is approved for the 60% buffer zone reduction credit.

DPR only requires tarp testing for chloropicrin. However, DPR's evaluation of the health risk for 1,3-dichloropropene (1,3-D) will be complete in approximately one year. DPR may or may not require tarp testing for 1,3-D after consideration of the completed risk assessment. You may want to include testing for 1,3-D at this time.

Tarps that were not submitted for laboratory analysis by May 15, 2015 will not be evaluated until the California-specific 60% buffer zone reduction credit list has been created from those tarps on

which data was submitted by that date, and then only in the order that they are received. DPR will conduct continuing field quality control sampling of tarps in use to assure that tarp character does not change. Any indication that a tarp has changed composition or construction will mean removal of the tarp from the list. You may want to retain samples of each tarp lot for comparison to DPR's test results.

Timeline for process:

	Final Date
Deadline to submit tarp samples to a qualified laboratory and notify DPR of the submittal	May 15, 2015
Submittal of laboratory results by the manufacturer	Within 30 days of receiving test results
Public notice of DPR's 60% buffer zone reduction credit tarp list	Approximately Dec. 31, 2015

In the interim, all tarps that are designated by U.S.EPA to receive a 60 percent credit for buffer zone reduction can be used as a tarpaulin that qualifies as TIF in the interim permit conditions for chloropicrin. County agricultural commissioners may impose more stringent chloropicrin tarpaulin requirements (than the EPA's). Proposed applications near sensitive sites and applications methods that result in high humidity conditions under the tarp, such as drip, should be evaluated to determine whether use of a particular tarp should be allowed at the proposed site. It is possible in some cases that the use will be allowed with additional site specific conditions including larger buffer zones.

Tarps will not be approved by DPR for 60% reduction of chloropicrin buffer zones unless the name and lot number are printed on the tarp. The name and lot number must be two to three inches in height and be printed at least 1 foot from each edge and at intervals of 20 – 30 feet along the length of the tarp and be visible during use in the field.

Permeability results submitted to DPR are not confidential and could be requested as part of the California Public Records Act.

If you have any questions, please feel free to contact Ms. Pam Wofford, Environmental Program Manager, at 916-324-4297, or <Pam.Wofford@cdpr.ca.gov>.

Sincerely,

Original signed by

Charles M. Andrews
Associate Director
916-445-3984

Attachment

cc: Pam Wofford, Environmental Program Manager (w/ Attachment)

Reference

ASTM International. 2014. Method E2945. Standard test method for Film Permeability Determination Using Static Permeability Cells.

Qian, Y., et al. 2011. Evaluation of the Permeability of Agricultural Films to Various Fumigants. Environ. Sci. Technol. 45, 9711-9718.

<u>Requirements for film permeability measurements</u>

Minimum requirements for film permeability study:

1. **Test method and test conditions**

   a. ASTM method E2945. Standard test method for Film Permeability Determination Using Static Permeability Cells.

   b. Temperatures 20 ± 2 °C

   c. Two humidity conditions
      i. Source cell humidity 30-50%, receiver cell humidity 30-50%
      ii. All replicates must have a humidity within ± 5% range.
      iii. Source cell humidity > 90%, receiver cell humidity=ambient humidity. Papiernik et al. (2010) describes humidity modifications

   d. Study duration
      i. Tests conducted at >90% humidity need to "condition" for >48 hrs before introducing the test compounds into the receiving cell.
      ii. Testing time is 10 days or when the concentration in the receiving cell is 90% of the concentration in the source cell (Cr/Cs=90%).

   e. Three replicates per humidity condition

   f. Analysis using "Film Permeability Analysis" FilmPC as provided by SR Yates

2. **Reporting requirements in addition to reporting requirements listed in method E2945**

   a. Description of tarp tested
      i. Tarp manufacturer
      ii. Tarp name/designation
      iii. Tarp material
      iv. Tarp thickness
      v. Other relevant descriptors or technical specifications (color, embossed, etc.)
      vi. Color digital photographs of film from 2 meters away and 20 cm away.

   b. Test substances:
      i. Test fumigants (% purity)
      ii. Other additives or solvents mixed with test substances

   c. Equipment:
      i. Description of test cells, including dimensions and details of any modifications
      ii. Analytical instrument(s) used, including instrumental parameters (e.g., manufacturer(s), column, detector, etc.)
      iii. Detection limit for analysis

   d. Test conditions:
      i. Test cell temperature range during experiment
      ii. Test cell low humidity (including description of method and instrument)
      iii. Test cell high humidity (including description of method and instrument)

iv. Testing protocol, including fumigant volumes/concentrations, sample collection schedule (number of samples, sample collection intervals, test duration), number of replicates

3. Test notes:

i. Description of deviations and modifications from the ASTM method E294

4. Test results:

i. Calculated mass transfer coefficients from individual tests, including graphs.
ii. Averages and standard deviation of all replicates should be tabulated.
iii. Compound concentrations or corresponding peak response at each sampling interval, supported by chromatograms.
iv. Percent recovery of each compound at each sampling time (sum of source and collection chambers relative to the total amount applied).
v. Analytical instrument calibration data.

References

Papiernik, Sharon K., Scott R. Yates and Daniel O. Chellemi. 2011. A standardized approach for estimating the permeability of plastic films to soil fumigants under various field and environmental conditions. JEQ Volume 40:1375-1382.

ASTM International. 2014. Method E2945. Standard test method for Film Permeability Determination Using Static Permeability Cells.