

## STANDARD OPERATING PROCEDURE

Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

---

### KEY WORDS

Totally Impermeable Film, TIF, Permeability Analysis

### APPROVALS

APPROVED BY: **Original Signed by:** \_\_\_\_\_ **DATE:** **12/22/2016**  
Pam Wofford  
Environmental Monitoring Branch Environmental Program Manager

APPROVED BY: **Original Signed by:** \_\_\_\_\_ **DATE:** **12/22/2016**  
Edgar Vidrio  
Environmental Monitoring Branch Senior Scientist

APPROVED BY: **Original Signed by:** \_\_\_\_\_ **DATE:** **1/3/2017**  
Chang Sook Lee Peoples  
Environmental Monitoring Branch Quality Assurance Officer

PREPARED BY: **Original Signed by:** \_\_\_\_\_ **DATE:** **12/27/2016**  
Kenneth D. King  
Environmental Monitoring Branch Environmental Scientist

Environmental Monitoring Branch organization and personnel, such as management, senior scientist, quality assurance officer, project leader, etc., are defined and discussed in [SOP ADMN002.01](#).

## STANDARD OPERATING PROCEDURE

### Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

---

#### 1.0 INTRODUCTION

##### 1.1 Purpose

This Standard Operating Procedure provides instructions for the proper collection and packaging for shipping of samples of Totally Impermeable Film (TIF) to ensure viability of samples for laboratory analysis of permeability using static permeability cells.

#### 2.0 MATERIALS NEEDED

2.1 Clean and sharp scissors, one pair

2.2 Bag, one

*A sealable polyethylene bag with interior dimensions sufficient to hold a stack of 9" by 12" samples as described below.*

2.3 Rigid layer, two

*A flat section of clean corrugated cardboard 9" wide and 12" long.*

2.4 Shipping package, one

*A small box of sufficient size to ship the samples. Interior dimensions of at least 9" by 12" by 1" are needed.*

2.5 Original product label (*if available*), one

2.6 Large rubber bands, two

2.7 Documentation

*A document containing a description of the film, name of technician collecting the sample, manufacturer, film properties such as composition of layers (if available), location of field, and the date collected.*

2.8 Material to be sampled.

*Overall size must be adequate to provide twelve (12) acceptable samples of appropriate size. This will be an absolute minimum of 10' in length and 3' in width.*

2.9 Paper, 13 sheets

*Flat and clean printer/copier type paper matching the 9" x 12" dimensions of the*

## STANDARD OPERATING PROCEDURE

### Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

---

*TIF samples to be shipped.*

- 2.10 Bubble wrap, minimum of 12" by 19"

## 3.0 PROCEDURES

- 3.1 To preserve sample integrity, only handle the TIF with clean, dry hands. Touching of the samples should be kept to a minimum.
- 3.2 Lay tarp section to be sampled over a smooth, clean surface to avoid damage. In field conditions, the tarp can be doubled over itself along the ground and samples can be taken from the protected topmost layer created by this doubling over (Figure 1).
- 3.3 Select a sample of the TIF that meets the following criteria:
- 3.3.1 Sample meets the minimum 9" by 12" sample size requirement.
  - 3.3.2 Sample will fit flatly into the bag and/or shipping package without any folding or rolling.
  - 3.3.3 Sample is not from the first 4' of the roll, as this may have been damaged during shipping or storage and may not be an accurate representation of film permeability (Figure 1).
  - 3.3.4 Samples will be taken from the 6' of TIF which follow the 4' that were presumed damaged (Figure 1).
  - 3.3.5 Sample is not within a distance from the edges of the roll that is equal to 1/4 of the width of the TIF roll (Figure 2).
  - 3.3.6 Sample is free from defects such as folds, holes, markings, scratches, or wrinkles.
  - 3.3.7 A sample is randomly selected from the acceptable region. Samples should be distributed across the 6' length by overall 1/2 TIF width to achieve a representative collection of samples (Figure 3).
- 3.4 Use scissors to cut the selected (minimum 9" by 12") sample section from the tarp. Avoid damaging the samples with stretching or tearing while cutting.

## STANDARD OPERATING PROCEDURE

### Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

---

- 3.5 Lay samples flat between sheets of paper as samples are collected.
- 3.6 Continue to add samples to the stack (without folding or rolling); alternate a sheet of paper with a sample. Begin and end the stack with a sheet of paper. (Figure 4).
- 3.7 When 12 samples have been alternated among 13 sheets of paper place a rigid layer both above and below the stack (Figure 5).
- 3.8 Use two large rubber bands aligned down the center of the stack both lengthwise and widthwise to hold the rigid layers, paper, and samples during shipping (Figure 6a).
- 3.9 Lay documentation and original product label, if available, atop the stack (Figure 6b).
- 3.10 Insert the stacked and bound samples into the bag and seal the bag. Do not fold or roll the samples. (Figure 6c).
- 3.11 Wrap the bagged sample stack with bubble wrap in a way that at least each face is protected.
- 3.12 Insert the samples into the shipping package (Figure 6d).
- 3.13 Securely close and seal the shipping package.
- 3.14 Mark the package as fragile.
- 3.15 Ship to this address:

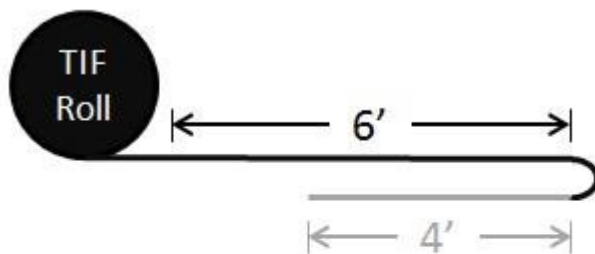
Husein Ajwa  
Department of Plant Sciences  
University of California – Davis  
1636 E. Alisal St.  
Salinas, CA 93905

## STANDARD OPERATING PROCEDURE

### Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

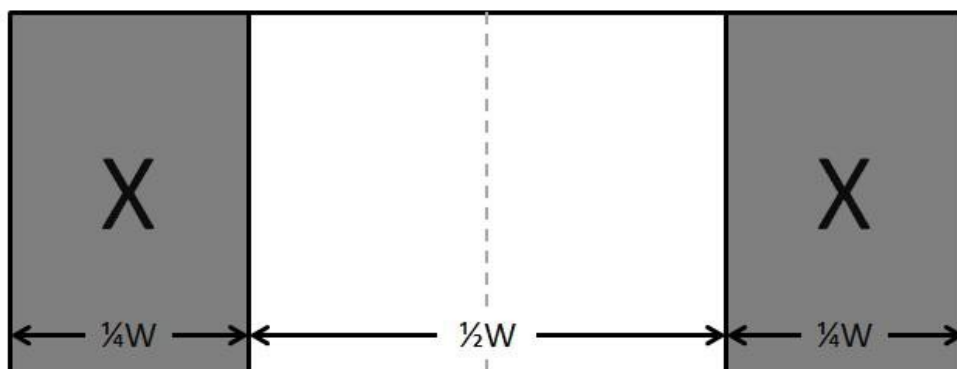
---

#### 4.0 FIGURES



Remove the first 4' of the roll, which may be used to protect the following 6' which will be used for the samples.

**Figure 1:** Selection of sample from length of roll



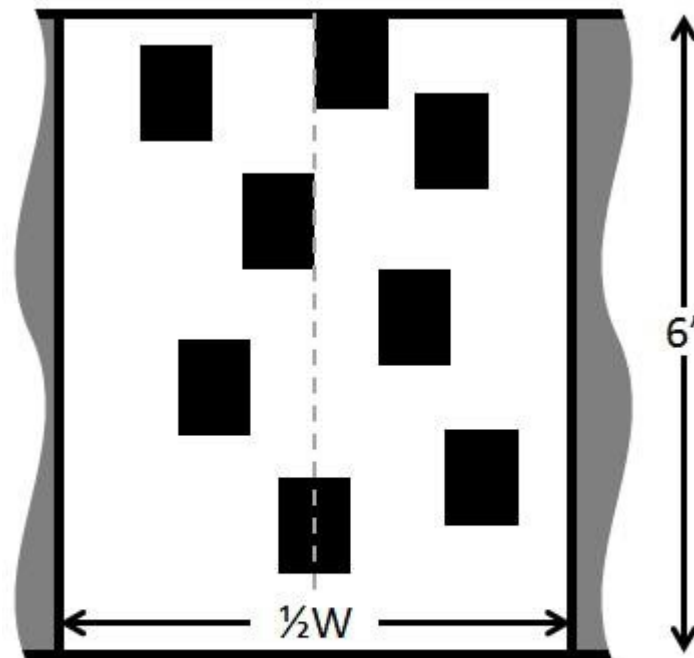
Do not select samples from the edge-most  $\frac{1}{4}$  of the overall width of the tarp.

**Figure 2:** Selection of sample from width of roll

## STANDARD OPERATING PROCEDURE

Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

---

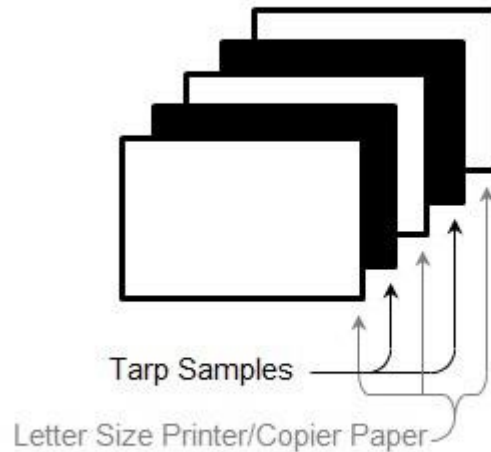


**Figure 3:** Select appropriately sized sections of sample from random places near the centerline of the roll. *Avoid any damaged areas or areas with defects.*

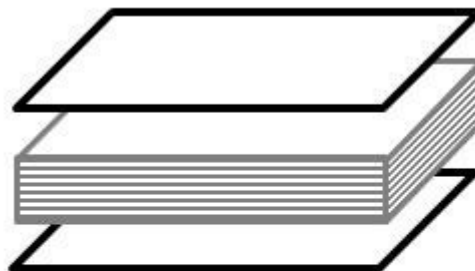
## STANDARD OPERATING PROCEDURE

### Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

---



**Figure 4:** Sandwich the layers of tarp between layers of clean creaseless printer/copier paper.

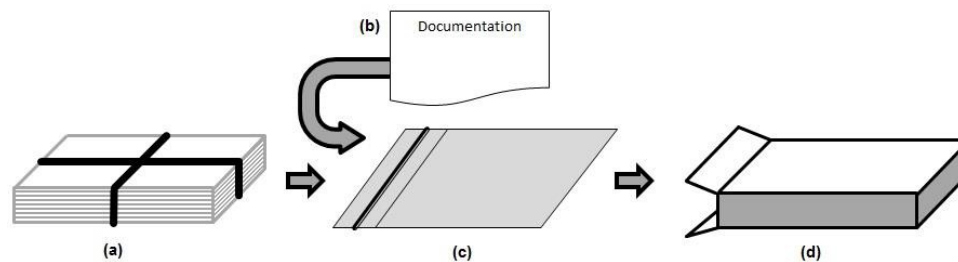


**Figure 5:** Sandwich the stack of samples between two layers of rigid material such as corrugated cardboard.

## STANDARD OPERATING PROCEDURE

### Procedure for Collecting Samples of Totally Impermeable Film for Permeability Analysis

---



**Figure 6:**

- a) Gently use two large rubber bands to bind the layers together as shown in black.
- b) Add proper documentation to the stacked samples and separators.
- c) Carefully insert these items into a sealable plastic bag of sufficient size, then seal this bag.
- d) Carefully insert the bagged samples into a shipping package.