



Sponsor: Precision Fabrics Date: December 2010
Study: Bed Bug Prevention of Fabric 10
Trial: Bed Bug Fabric Feeding Prevention 10-3
Test Method: 314-2.00

Report Title:

Evaluation of Precision Fabrics 66356-***-1234, Super tight for bed bugs and 66457-***-0120, Super tight for bed bugs in Preventing Bed Bug (*Cimex lectularius*) Penetration and Feeding When Presented with a Human Host

Study:

Bed Bug Prevention of Fabric 10

Trial:

Bed Bug Fabric Feeding Prevention 10-3

Experimental Start Date:

November 11, 2010

Experimental Completion Date:

November 11, 2010

Report Date:

December 2010

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Objective(s):

To evaluate Precision Fabrics 66356-***-1234, Super tight for bed bugs and 66457-***-0120, Super tight for bed bugs, in preventing bed bug (*Cimex lectularius*) penetration and feeding when presented with a human host.

Test Substances:

1. Fabric 66356-***-1234, Super tight for bed bugs, (Snell Code: 110410-1-D-PRE)
2. Fabric 66457-***-0120, Super tight for bed bugs, (Snell Code: 110410-2-D-PRE)

Materials and Methods:

The following is the Snell Scientifics Standardized Testing Method for evaluating the efficacy of fabrics and closures as barriers to hematophagous arthropods. Further details related to this specific study are described following the test method summary. Select action items and illustrations have been removed from this standardized test method in an effort to make the report more precise and accurate to the study conducted. Any details removed from this test method were deemed irrelevant to the study conducted in this report.

314.1 Materials:

- 314.1.1 Glass jars – pint size jars w/ screw on lids.
- 314.1.2 Cardboard – harborage inserts inside jars.
- 314.1.3 Fabrics- test fabrics.
- 314.1.4 Feeding attractant – Human subject to attract bed bugs.
- 314.1.5 CO2 and regulator – standard 20 pound cylinders and gas regulator - used for anesthetizing insects (as necessary, depending on species).
- 314.1.6 Intermediate transfer/holding chambers – used for housing insects after they have been removed from their primary breeding housing. Intermediate chambers were used to anesthetize insects and sort them into jars.
- 314.1.7 Count down timer – used to accurately measure exposure times.

314.2 Methods:

- 314.2.1 Pint size jars were equipped with the test fabrics by:
 - o Placing the fabric over the open end of the jar and securing the outer screw on lid over the fabric.



- 314.2.2 Pint jars were equipped with cardboard inserts that provided harborage for the bed bugs and also allowed access for the bed bugs to travel from the bottom of the jar to the lid/fabric area of the jar.
- 314.2.3 Each jar contained approximately ~500 various size bed bugs (1st instars – adults), eggs, and debris.
- 314.2.4 Various sized bed bugs allowed for evaluating the possibility of different sized mouth parts feeding through the test fabrics.
- 314.2.5 Bed bugs used for feed through tests were starved for at least 7 days prior to testing.
- 314.2.6 To evaluate for feed through ability, the fabrics were held to human body parts for at least 15 minutes.
- 314.2.7 Following the 15 minute feeding exposure, the bed bugs were removed from the pint jars and inspected for signs of feeding.
- 314.2.8 Feeding through the test fabrics was documented as yes/no or # fed during the 15 minute exposure.
- 314.2.9 Additional Testing Details Not Fully Described in Standard Protocols:

Test Set-Up: The evaluations in this study followed Test Photographs 1-3.

Test System Information:

Test System	Strain	Stage/Age	# Replicates per Substance	# Specimens per Replicate
Bed Bugs (<i>Cimex lectularius</i>)	Susceptible	Mixed	1	~500

Source of Test Systems: The test systems were taken from laboratory reared colonies.

Exposure of Test Systems: The test systems were exposed to the human host for 15 minutes.

Environmental Conditions:

Conditions in Laboratory: Temperature: 76° F Humidity: 53%

Method Used to Evaluate Testing Results:

Arena was opened and insects were examined to ascertain if feeding had taken place. The measure of feeding was any additional color or swelling of the insect’s abdomen.



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Results / Discussion:

The results of this study are tabulated in Tables 1-2. Each table illustrates the number of bed bugs (*Cimex lectularius*) that fed through the fabric onto the human host, the number that escaped, and the number of blood spots that were observed on the fabric after the 15 minute evaluations.

As Tables 1 and 2 illustrate, no bed bugs were successful in feeding through either of the test fabrics during the 15 minute studies. The fabrics prevented all stages of bed bugs from escaping during the evaluations and observations of the fabrics after removal from the jars showed no signs of blood staining on the fabrics that could be attributed to feeding. During the 15 minute evaluations, the 66356-***-1234 and 66457-***-0120 fabrics were successful in preventing bed bug (*Cimex lectularius*) penetration and feeding.



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Tables:

Table 1.

Fabric Feed Through Method: 66356-***-1234						
Rep	Exposure Time	Bed Bug Stage	Approx # of Stage	# Fed	# Escaped	# Blood Spots on Fabric
A	15 minutes	Mixed	~ 500	0	0	0

Table 2.

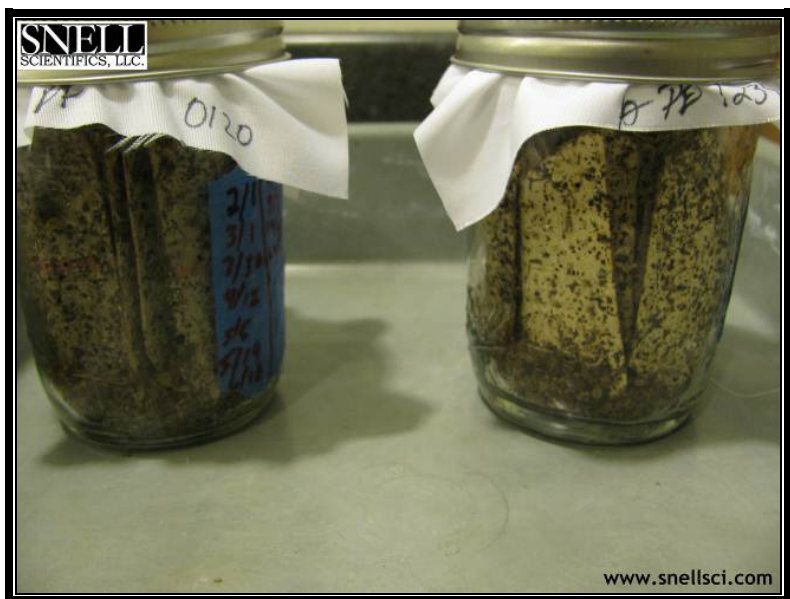
Fabric Feed Through Method: 66457-***-0120						
Rep	Exposure Time	Bed Bug Stage	Approx # of Stage	# Fed	# Escaped	# Blood Spots on Fabric
A	15 minutes	Mixed	~ 500	0	0	0

Appendix A: Photographs

Photograph 1. Fabrics Sealed onto Pint Jars



Photograph 2. Bed Bug Jars



Photograph 3. Fabric/Bed Bug Jar Being Held to the Arm of the Human Host





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Appendix B: Raw Data

Snell Scientifics LLC: Additional Test Details - Non GLP Tests 09/10/10

Sponsor: Precision Fabrics
Study: Bed Bug Prevention of Fabric 10

Contact: David Stalls

Files: Data File: PrecisionBBFabric10
 Worksheet: BB fabric 10-3
 Report File: PrecisionBBFabric10-3

Test Products Received: 11/04/10

The Evaluations in this Study Followed TM#: 314-2.00

- Trial/Details: **Bed Bug Fabric Feeding Prevention**
- Fabric sections are to be sealed into pint jar lids
 - Enclose unfed bedbugs inside jar (at least 7 day unfed)
 - Expose jar to human body part for 15 minutes
 - Monitor for any feeding

Species/Replicates:

Test Species	Stage/Age	# Reps	# per Rep	# per Product	# Test Products	Total # Specimens	# Test Arenas
Bed Bugs (susceptible)	Mixed	1	~ 500	N/A	2	~ 1000	2

Source of Test Specimens: Laboratory reared

Insect Exposure time: Fabric feeding - 15 minutes to body part

Observation Times: Feed through: 15 minutes each

Test Products:

1. Fabric 66356-***-1234, Super tight for bed bugs, (Snell Code: 110410-1-D-PRE)
2. Fabric 66457-***-0120, Super tight for bed bugs, (Snell Code: 110410-2-D-PRE)

Additional Test Details Preparer: **Todd Smith**

Preparer Signature: _____ Date: 11/11/10

Primary Researcher Signature: _____ Date: 11/11/10



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Sponsor: Precision Fabrics Group TM#: 314-2 Page 1 of 1

Study / Trial: Bed bug Fabric Prev. Test System: Bed Bugs Astenisk: * =
 Susceptible strain Details: ** =

Arena Details: fabric sealed onto pint jars with bed bugs

Other Details: _____

Rep #'s: A Date(s): 11/11/10 Temp (F): 76 RH %: 53
 Rep #'s: _____ Date(s): _____ Temp (F): _____ RH %: _____

Fabric Feed Through Method: 66356-***-1234						
Rep	Exposure Time	Bed Bug Stage	Approx #	# Fed	# Escaped	# Blood Spots on Fabric
A	15 min	Mated	~500	0	0	0
Initials					TS	
Date:					11/11/10	

Fabric Feed Through Method: 66457-***-0120						
Rep	Exposure Time	Bed Bug Stage	Approx #	# Fed	# Escaped	# Blood Spots on Fabric
A	15 min	Mated	~500	0	0	0
Initials					TS	
Date:					11/11/10	

Researcher(s):
 Name: Todd Smith Signature: [Signature] Date(s): 11/11/10 Role: Data Recorder
 Name: Eric Snell Signature: [Signature] Date(s): 11/11/10 Role: Primary Res.



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Appendix C: Test Substance Receiving Log

Snell Scientifics, LLC. Test Substance Receipt Log

Arrival Date	Test Substance Sponsor/Study	Substance Snell Sci. Code:	Test Substance (Trade name, % AI, formulation)	Lot/Batch #	EPA Reg. #	Amnt. Rec'd	Container Type	Shipper	Packaging Condition	Photo Taken (y/n)	MSDS Provided (y/n)	MSDS Down-loaded (y/n)	MSDS Logged (y/n)	Storage Location	Initials
11/4/2010	Precision BB Fabric 10-3	110410.1-D. PRE	66396-***-1234 Super Tight for Bed Bugs	N/A	N/A	1 Swatch	Clear Ziploc Bag	Fed Ex	Good	Y	Y	N	N	D	[Handwritten Initials]
11/4/2010	Precision BB Fabric 10-3	110410.2-D. PRE	66457-***-0120 Super Tight for Bed Bugs	N/A	N/A	1 Swatch	Clear Ziploc Bag	Fed Ex	Good	Y	Y	N	N	D	[Handwritten Initials]



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VEGA SHIP (midnight) - 11:00:00 (AEST)

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From: Origin ID: GSXA (336) 510-3128 David Stebb Precision Fabrics Group 301 East Meadowview Rd Greensboro, NC 27408		Ship Date: 03NOV10 AmtWgt: 9.7 LB CAC: 34/8801/NE12090
Ship To: (770) 368-4501 Eric Snell Snell Scientific, LLC 188 VEGA RD MEANSVILLE, GA 30256	BILL BENDER	Delivery Address Bar Code 
	TRK# 7964 1255 1932 (020)	THU - 04 NOV A5 STANDARD OVERNIGHT R88
NE MCNA	30256 GA-08 ATL	

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11/3/2010