



Fibers Analysis Test No. 24-5439 Summary Report

Each participant received a sample set consisting of known fabric and two sets of questioned fibers which they were asked to examine using their existing protocols. Data were returned from 103 participants and are compiled into the following tables:

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This report contains the data received from the participants in this test. Since these participants are located in many countries around the world, and it is their option how the samples are to be used (e.g., training exercise, known or blind proficiency testing, research and development of new techniques, etc.), the results compiled in the Summary Report are not intended to be an overview of the quality of work performed in the profession and cannot be interpreted as such. The Summary Comments are included for the benefit of participants to assist with maintaining or enhancing the quality of their results. These comments are not intended to reflect the general state of the art within the profession.

Participant results are reported using a randomly assigned "WebCode". This code maintains participant's anonymity, provides linking of the various report sections, and will change with every report.

Manufacturer's Information

Each sample set contained one section of known fabric (Item 1) and two sets of questioned fibers (Items 2 and 3). Participants were asked to examine the fibers, identify the fiber type, and determine if the questioned fibers could have originated from the known fabric.

SAMPLE PREPARATION: Both fabrics were laid out separately and a lint roller was used to remove any extraneous debris. All items were prepared at different times to prevent any possibility of cross-contamination.

ITEMS 1 AND 2 (ASSOCIATION): For the known fabric (Item 1) and the questioned fibers (Item 2), a 1/2-yard section of fabric (labeled as 100% Rayon) was first cut into 2" x 2" square swatches. A predetermined number of swatches were deposited and folded into a glassine bag, then placed into a pre-labeled Item 1 envelope and sealed. The remaining swatches were used to prepare the Item 2 questioned fibers. For each Item 2 in this set, warp and weft fibers were teased from the edges of the fabric swatches, deposited and folded into a glassine bag, then placed into a pre-labeled Item 2 envelope and sealed.

ITEM 3 (ELIMINATION): For the questioned fibers (Item 3), a 1/2-yard section of fabric (labeled as 100% Cotton) was first cut into 2" x 2" square swatches. Warp and weft fibers were teased from the edges of the fabric swatches, deposited and folded into a glassine bag, then placed into a pre-labeled Item 3 envelope and sealed.

SAMPLE SET ASSEMBLY: For each sample set, Items 1, 2, and 3 were placed into a pre-labeled envelope and sealed. This process was repeated until all of the sample sets were prepared.

VERIFICATION: All predistribution laboratories reported the expected results, which included fiber type determination and/or generic name. The following procedures were used to examine the items: Stereomicroscopy, Polarized Light, Comparison Microscopy, Fluorescence, Macroscopic Examination, IR/FTIR, and Microspectrophotometry.

Item	Fiber Type	Generic Name
1	Manufactured	Rayon
2	Manufactured	Rayon
3	Vegetable	Cotton

Summary Comments

This test was designed to allow participants to assess their proficiency in the examination, identification, and comparison of fibers. Participants were supplied with one known piece of fabric (Item 1) and two sets of questioned fibers (Items 2 and 3). Items 1 and 2 originated from the same black fabric labeled as 100% Rayon. Item 3 originated from a different black fabric labeled as 100% Cotton. Refer to the Manufacturer's Information for preparation details.

Table 1: Association Results

Of the 103 responding participants, 99 (96%) participants identified Item 2 and eliminated Item 3 as having originated from the Item 1 known fabric.

Table 2: Fiber Type Determination

For Items 1 and 2, 97 of the 103 responding participants (94%) reported the fiber type, which consisted of Manufactured, Rayon. For Item 3, 94 of the 103 responding participants (91%) reported the fiber type, which consisted of Vegetable, Cotton. CTS is aware that some laboratories may not further identify the fibers once an exclusionary difference has been made. Thus, responses including "not further categorized/characterized" are not indicated as outliers for elimination items.

Table 3: Examination Methods

Of the 103 responding participants, 609 methods of analysis were reported in total. The most commonly reported examination methods included: Stereomicroscopy (96%), IR/FTIR (92%), and Polarized Light (92%).

Association Results

Could either of the questioned fibers recovered from the suspect (Item 2 and Item 3) have originated from the victim's t-shirt (Item 1)?

TABLE 1

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
2RHZV7	Yes	No	93RV7W	Yes	No
2YD3WG	Yes	No	947FY7	Yes	No
3E7XA8	Yes	No	97XCNZ	Yes	No
3GCHX8	Yes	No	98PZW3	Yes	No
3M3T87	Yes	No	9WMA3Z	Yes	No
3RAGK8	Yes	No	ATKQFR	Yes	No
3WQN98	Yes	No	AWK843	Yes	No
4TKKWB	Yes	No	AXCXXZ	Yes	No
68ZZEZ	Yes	No	B2CAUZ	Yes	No
6DNNA7	Yes	No	BHZM78	Yes	No
6EXVCY	Yes	No	BN6HRR	Yes	No
6KLFHZ	Yes	No	BUQHYZ	Yes	No
6PKU34	Inconclusive	Inconclusive	C4DUU6	Yes	No
6TFK9F	Yes	No	CEUG7R	Yes	No
7BGMNY	Yes	No	D96KF8	Yes	No
7FARG4	Yes	No	DCKT47	Yes	No
7K4LE6	Yes	No	DLD4D2	Yes	No
7NFTFA	Yes	No	DM6Z3V	Yes	No
8PRNXU	Yes	No	DQ6987	Yes	No
8TPAMC	Yes	No	DQMJMQ	Yes	No
8VVUDX	Yes	No	E7T3XM	Yes	No

TABLE 1- Association Results

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
EAREUM	Yes	No	MLX3MH	Yes	No
EYUJU7	Yes	No	NA6ZJG	Yes	No
F7PZLN	Yes	No	NTVEVK	Yes	No
FN9JVN	Yes	No	P94MAT	Yes	No
FVRY8Y	Yes	No	PC32WJ	Yes	No
G8Z39M	Yes	No	PP79RF	Yes	No
G9A8JP			PQJY2J	Inconclusive	No
HQT6M3	Yes	No	Q2Y6DD	Yes	No
HZWFTR	Yes	No	QAB68P	Yes	No
J4QVJQ	Yes	No	QP8J8H	Yes	No
JKXT3P	Yes	No	QRUXWT	Yes	No
JNX27Z	Yes	No	QVRNWC	Yes	No
JYWYUZ	Yes	No	R4HJET	Yes	No
K9ZCQU	Yes	No	R9YR3T	Yes	No
KFYYHU	Yes	No	RA9WGG	Yes	No
KP93TY	Yes	No	TCPMWB	Yes	No
KT9EQK	Yes	No	TCR9TR	Yes	No
KUGQ7Z	Yes	No	TFTCKE	Yes	No
LEMJNT	Yes	No	TNLTQA	Yes	No
LZ27CJ	Yes	No	TUA8ZB	Yes	No
MA8BZT	Yes	No	UEBR69	Yes	No
MALWBF	Yes	No	UJ7L3A	Yes	No
MBGFBW	Yes	No	ULCYRN	Yes	No
MG47XR	Yes	No			

TABLE 1- Association Results

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
UPCANN	Yes	No			
UU76NB	Yes	No			
UU78DF	No	No			
VWQBKD	Yes	No			
WAVUWD	Yes	No			
X6TG66	Yes	No			
X6V337	Yes	No			
XCF69M	Yes	No			
YJBMZ6	Yes	No			
YTLPL7	Yes	No			
YWEXL7	Yes	No			
Z326J6	Yes	No			
Z34PEK	Yes	No			
ZBDETJ	Yes	No			

Association Response Summary			Participants: 103
<p>Could either of the questioned fibers recovered from the suspect (Item 2 and Item 3) have originated from the victim's t-shirt (Item 1)?</p>			
	<u>Item 2</u>	<u>Item 3</u>	
Yes:	99 (96.1%)	0 (0.0%)	
No:	1 (1.0%)	101 (98.1%)	
Inc:	2 (1.9%)	1 (1.0%)	
<p>The sum of the responses here may be less than the total number of participants responding due to omitted responses.</p>			

Fiber Type Determination

What is the fiber type and generic name of the fiber(s) in each item?

TABLE 2

WebCode	Item 1	Item 2	Item 3
2RHZV7	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
2YD3WG	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
3E7XA8	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
3GCHX8	Manufactured, regenerated cellulose	Manufactured, regenerated cellulose	Vegetable, Cotton
3M3T87	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
3RAGK8	Manufactured fibre, regenerated cellulose fibre, Rayon	Manufactured fibre, regenerated cellulose fibre, Rayon	Vegetable, Cotton
3WQN98	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
4TKKWB	Manufactured Rayon	Manufactured Rayon	Vegetable Cotton
68ZZEZ	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
6DNNA7	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
6EXVCY	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
6KLFHZ	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
6PKU34	Manufactured; Cellulose	Manufactured; Cellulose	Vegetable; Cotton
6TFK9F	Rayon	Rayon	Cotton
7BGMNY	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
7FARG4	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
7K4LE6	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
7NFTFA	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
8PRNXU	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
8TPAMC	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
8VVUDX	Rayon	Rayon	Cotton
93RV7W	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
947FY7	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
97XCNZ	manufactured Rayon	manufactured Rayon	Vegetable Cotton
98PZW3	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
9WMA3Z	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
ATKQFR	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
AWK843	Rayon	Rayon	Cotton

TABLE 2- Fiber Type Determination

WebCode	Item 1	Item 2	Item 3
AXCXXZ	Manufactured- Rayon	Manufactured - Rayon	Vegetable - Cotton
B2CAUZ	Rayon	Rayon	Cotton
BHZM78	Unidentified Manufactured fiber	Unidentified Manufactured fiber	Unidentified Manufactured fiber
BN6HRR	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
BUQHYZ	Manufactured- Rayon	Manufactured- Rayon	Vegetable- not further characterized
C4DUU6	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
CEUG7R	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
D96KF8	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
DCKT47	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
DLD4D2	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
DM6Z3V	Manufactured Rayon	Manufactured Rayon	Vegetable Cotton
DQ6987	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
DQMJMQ	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
E7T3XM	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
EAREUM	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
EYUJU7	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
F7PZLN	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
FN9JVN	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
FVRY8Y	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
G8Z39M	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
G9A8JP	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
HQT6M3	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
HZWFR	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
J4QVJQ	Rayon	Rayon	Cotton
JKXT3P	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
JNX27Z	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
JYWYUZ	Manufactured, Rayon	Manufactured, Rayon	Vegetable Cotton
K9ZCQU	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
KFYYHU	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
KP93TY	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton

TABLE 2- Fiber Type Determination

WebCode	Item 1	Item 2	Item 3
KT9EQK	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
KUGQ7Z	Manufactured, Rayon (modal)	Manufactured, Rayon (modal)	Vegetable, Cotton
LEMJNT	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
LZ27CJ	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
MA8BZT	Synthetic, Rayon	Synthetic, Rayon	Vegetable, Cotton
MALWBF	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
MBGFBW	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
MG47XR	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
MLX3MH	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
NA6ZJG	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
NTVEVK	Manufactured, Rayon	Manufactured, Rayon	Vegetable, NATURAL (MIX OF Cotton+FLAX(LINEN))
P94MAT	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
PC32WJ	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
PP79RF	Manufactured, Rayon	Manufactured, Rayon	Vegetable, not further characterized
PQJY2J	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
Q2Y6DD	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
QAB68P	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
QP8J8H	Manufactured, unable to determine under LPM	Manufactured, unable to determine under LPM	Vegetable, Cotton
QRUXWT	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
QVRNWC	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
R4HJET	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
R9YR3T	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
RA9WGG	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
TCPMWB	Manufactured, Rayon	Manufactured, Rayon	Vegetable, not further characterized
TCR9TR	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
TFTCKE	Manufactured-Rayon	Manufactured-Rayon	Vegetable-Cotton
TNLTQA	Manufactured - Rayon	Manufactured - Rayon	Vegetable - not further categorized
TUA8ZB	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton

TABLE 2- Fiber Type Determination

WebCode	Item 1	Item 2	Item 3
UEBR69	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
UJ7L3A	Manufactured, Rayon	Manufactured, Rayon	Vegetable, not further characterized
ULCYRN	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
UPCANN	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
UU76NB	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
UU78DF			
VWQBKD	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
WAVUWD	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
X6TG66	Manufactured - Rayon	Manufactured - Rayon	Vegetable - not further categorized
X6V337	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
XCF69M	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
YJBMZ6	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
YTLPL7	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
YWEXL7	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
Z326J6	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton
Z34PEK	Manufactured, Rayon	Manufactured, Rayon	Manufactured, Rayon
ZBDETJ	Manufactured, Rayon	Manufactured, Rayon	Vegetable, Cotton

Fiber Type Determination Response Summary			Participants: 103
What is the fiber type and generic name of the fiber(s) in each item?			
	<u>Item 1</u>	<u>Item 2</u>	<u>Item 3</u>
Rayon:	97 (94.2%)	97 (94.2%)	Cotton: 94 (91.3%)
*Other:	5 (4.9%)	5 (4.9%)	*Other: 8 (7.8%)
*This category represents the total number of participants that reported a response other than the consensus response.			

The sum of the responses here may be less than the total number of participants responding due to omitted responses.

Examination Methods

TABLE 3

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
2RHZV7	✓	✓	✓	✓	✓	✓	✓				
2YD3WG	✓	✓	✓	✓	✓	✓	✓				
3E7XA8	✓	✓	✓	✓	✓	✓					
3GCHX8	✓	✓	✓	✓	✓	✓	✓				
3M3T87	✓		✓			✓	✓				
3RAGK8	✓		✓	✓	✓	✓	✓				
3WQN98	✓			✓	✓	✓	✓				
4TKKWB	✓	✓	✓		✓						
68ZZEZ	✓		✓	✓		✓	✓				
6DNNA7	✓	✓	✓	✓	✓	✓	✓				
6EXVCY	✓	✓		✓		✓	✓				
6KLFHZ	✓	✓	✓	✓		✓					
6PKU34	✓		✓		✓	✓					
6TFK9F	✓	✓	✓	✓	✓	✓	✓				
7BGMNY	✓	✓	✓	✓	✓	✓	✓				raman
7FARG4						✓					SEM/EDS
7K4LE6	✓	✓	✓		✓		✓		✓		
7NFTFA	✓	✓	✓	✓	✓	✓	✓				
8PRNXU	✓		✓	✓	✓	✓		✓			Optical Microscopy and Raman Spectroscopy
8TPAMC	✓	✓	✓	✓	✓	✓	✓	✓			
8VVUDX	✓	✓	✓			✓					
93RV7W	✓	✓	✓	✓		✓	✓				
947FY7	✓	✓	✓	✓	✓	✓	✓				
97XCNZ	✓		✓		✓	✓	✓				

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
98PZW3	✓	✓	✓	✓		✓	✓				
9WMA3Z	✓		✓		✓	✓	✓				
ATKQFR	✓	✓	✓	✓	✓	✓	✓	✓			SEM/EDS
AWK843	✓	✓	✓	✓	✓	✓	✓				
AXCXXZ			✓		✓	✓					
B2CAUZ	✓	✓	✓	✓		✓	✓				Raman
BHZM78	✓		✓		✓			✓			Refractive Index
BN6HRR	✓	✓	✓	✓	✓	✓	✓	✓			
BUQHYP	✓	✓	✓	✓	✓	✓	✓				optical cross-section
C4DUU6	✓	✓	✓		✓	✓					
CEUG7R	✓	✓	✓	✓	✓	✓	✓	✓			
D96KF8	✓	✓	✓		✓	✓					UV light source
DCKT47	✓	✓	✓	✓	✓	✓					
DLD4D2	✓	✓	✓	✓	✓	✓	✓				
DM6Z3V	✓		✓		✓	✓					
DQ6987	✓	✓	✓	✓	✓		✓				
DQMJMQ	✓		✓			✓				✓	
E7T3XM	✓	✓	✓	✓	✓	✓	✓				
EAREUM	✓	✓	✓	✓		✓	✓				
EYUJU7	✓	✓	✓	✓	✓	✓		✓			
F7PZLN	✓	✓	✓	✓	✓	✓	✓				Raman spectroscopy, Microchemical test
FN9JVN	✓	✓	✓	✓	✓	✓	✓				
FVRY8Y	✓	✓	✓	✓	✓	✓	✓				Raman
G8Z39M	✓	✓	✓			✓		✓			
G9A8JP	✓		✓		✓	✓					

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
HQT6M3	✓	✓	✓	✓	✓	✓	✓	✓			
HZWFTR	✓	✓			✓						Pyrolysis-GCMS
J4QVJQ	✓	✓	✓	✓	✓	✓	✓				
JKXT3P	✓	✓			✓						RAMAN MICROSCOPE
JNX27Z	✓	✓	✓	✓	✓						
JYWYUZ	✓	✓	✓	✓	✓	✓	✓				
K9ZCQU	✓	✓			✓	✓					Dye extraction
KFYYHU	✓	✓	✓		✓	✓					
KP93TY	✓	✓	✓	✓		✓					
KT9EQK	✓	✓	✓		✓	✓					
KUGQ7Z	✓	✓	✓		✓	✓					
LEMJNT	✓	✓	✓	✓	✓	✓		✓			
LZ27CJ	✓	✓	✓	✓	✓	✓	✓	✓			Berek Compensator
MA8BZT	✓	✓	✓	✓		✓	✓				
MALWBF	✓	✓	✓		✓	✓	✓	✓			PGC-MS, Alternate Light Source
MBGFBW	✓	✓	✓	✓	✓	✓		✓			
MG47XR	✓	✓	✓	✓		✓	✓	✓			Raman spectrophotometer
MLX3MH	✓	✓	✓	✓	✓	✓	✓				
NA6ZJG	✓	✓	✓	✓		✓	✓				
NTVEVK		✓	✓	✓	✓						GC\MS PYROLYSIS
P94MAT	✓	✓	✓	✓	✓	✓	✓	✓			
PC32WJ	✓	✓			✓	✓					
PP79RF	✓	✓	✓	✓	✓	✓	✓				
PQJY2J	✓	✓	✓	✓		✓	✓				
Q2Y6DD	✓	✓	✓	✓	✓	✓	✓	✓			

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
QAB68P	✓	✓	✓	✓	✓	✓	✓	✓	✓		PGC/MS, Raman
QP8J8H	✓										
QRUXWT	✓	✓	✓	✓	✓	✓	✓				
QVRNWC	✓		✓			✓					
R4HJET	✓	✓	✓	✓	✓	✓	✓		✓		
R9YR3T	✓	✓	✓	✓	✓	✓	✓	✓	✓		
RA9WGG			✓		✓	✓					
TCPMWB	✓	✓	✓	✓		✓	✓				
TCR9TR	✓	✓	✓	✓	✓	✓	✓				
TFTCKE	✓	✓	✓	✓	✓	✓	✓				
TNLTQA	✓	✓	✓	✓	✓	✓	✓				
TUA8ZB	✓	✓	✓		✓	✓	✓				UV light
UEBR69	✓	✓	✓								
UJ7L3A	✓	✓	✓	✓	✓	✓	✓				
ULCYRN	✓	✓	✓	✓		✓	✓				
UPCANN	✓	✓	✓		✓	✓	✓				
UU76NB	✓	✓	✓	✓	✓	✓	✓				
UU78DF	✓				✓	✓		✓			
VWQBKD	✓		✓		✓	✓	✓				
WAVUWD	✓				✓	✓		✓			PY-GCMS; SEM/EDS
X6TG66	✓	✓	✓	✓	✓	✓	✓				
X6V337	✓	✓	✓	✓	✓	✓	✓		✓		
XCF69M	✓	✓	✓	✓	✓	✓	✓		✓		
YJBMZ6	✓			✓	✓	✓		✓			
YTLPL7	✓	✓	✓	✓	✓	✓	✓		✓		

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
YWEXL7	✓	✓	✓	✓	✓	✓	✓	✓			
Z326J6	✓	✓	✓	✓	✓	✓					
Z34PEK	✓	✓	✓	✓	✓	✓					
ZBDETJ	✓	✓	✓		✓	✓		✓			

Examination Methods Response Summary											Participants: 103
	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	
Participants	99	75	95	69	77	95	67	5	24	3	
Percent	96%	73%	92%	67%	75%	92%	65%	5%	23%	3%	

Conclusions

TABLE 4

WebCode	Conclusions
2RHZV7	<p>In our opinion, we consider that there is very strong support that the black rayon fibres (yarns, Item 2) recovered from the suspect came from the victim's T-shirt (Item 1), rather than the fibres (yarns) having come from another source(s) made from identical fibres which happen to match by chance. Overall therefore, in our opinion, the finding of four yarns comprised of black rayon fibres on the suspect (Item 2) which match the black rayon fibres comprising the victim's T-shirt, (Item 1) could be explained by the suspect having been in direct contact with the victim, for example if the suspect had robbed the victim as reported. In our opinion, the fibres (yarns) within Item 3, also recovered from the suspect, could not have originated from the victim's T-shirt (Item 1).</p>
2YD3WG	<p>CONCLUSIONS: Questioned yarns identified as recovered from the suspect (Item 2) originated from the victim's t-shirt (Item 1) or another source of textile material possessing the same distinct characteristics. Questioned yarns identified as recovered from the suspect (Item 3) did not originate from the portion of the victim's t-shirt represented by Item 1. RESULTS: Questioned yarns identified as recovered from the suspect (Items 2 and 3) were examined for the purpose of determining whether or not they are consistent with the known fabric of the victim's t-shirt (Item 1). Examination of Item 2 reveals the presence of four black yarns composed of rayon fibers. Examination and comparison of the yarns from Item 2 with yarns from the fabric of the victim's t-shirt (Item 1) reveals they are consistent in construction. Further examination and comparison of fibers composing the yarns from Item 2 with fibers composing the fabric from the victim's t-shirt (Item 1) reveals they are consistent in microscopic, optical, and chemical characteristics. It is therefore concluded the yarns from Item 2 originated from the victim's t-shirt (Item 1) or another source of textile material possessing the same distinct characteristics. Examination of Item 3 reveals the presence of four black yarns composed of cotton fibers. Examination and comparison of the yarns from Item 3 with the fabric from the victim's t-shirt (Item 1) reveals they are inconsistent in fiber composition. It is therefore concluded the yarns from Item 3 did not originate from the portion of the victim's t-shirt represented by Item 1. METHODS OF ANALYSIS: Examinations were performed visually, by stereo microscopy, brightfield/polarized light comparison microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared microspectroscopy.</p>
3E7XA8	<p>Questioned fibers recovered from the suspect (Item2) were consistent (indistinguishable) with the fibers of the Known section of fabric from the victim's t-shirt (Item1) in macroscopic, microscopic and infrared (FTIR) characteristics. Therefore the questioned fibers recovered from the suspect (Item2) could have come from the Known section of fabric from the victim's t-shirt (Item1) or another source of fibers with similar macroscopic, microscopic and infrared (FTIR) characteristics. Questioned fibers recovered from the suspect (Item3) were dissimilar (distinguishable) to the fibers of the Known section of fabric from the victim's t-shirt (Item1). Therefore the questioned fibers recovered from the suspect (Item3) could not have come from the Known section of fabric from the victim's t-shirt (Item1).</p>
3GCHX8	<p>Item 1 was a black coloured fabric which was comprised of grey regenerated cellulosic fibres. Item 2 was black coloured threads comprised of grey regenerated cellulosic fibres which were indistinguishable by microscopy and instrumental colour analysis from the fibres comprising Item 1. Item 3 was black coloured threads comprised of grey cotton fibres. These were not examined further as they were a different fibre type to those that comprised Item 1 and as such, could not have originated from Item 1. In my opinion, possible explanations for the findings include: The grey regenerated cellulosic fibres (Item 2) recovered from the suspect originated from the T-shirt (Item 1). The grey regenerated cellulosic fibres (Item 2) recovered from the suspect did not originate from the T-shirt (Item 1) and originate from another source(s). In my opinion, considering the type and colour of the indistinguishable fibres, the findings provide moderately strong support for the grey regenerated cellulosic fibres recovered from the suspect (Item 2) having originated from the T-shirt (Item 1).</p>
3M3T87	<p>Item 2 was originated from Item 1, but Item 3 was not. All of 3 items are black cellulose fibers, confirmed by FT-IR and microspectrophotometry, but polarization shape of item 3 are different from those of item 1 and 2.</p>
3RAGK8	<p>The questioned fibres from Item 2 are indistinguishable in all examined characteristics to fibres in Item</p>

TABLE 4

WebCode	Conclusions
	1. Gray regenerated cellulose fibres from Item 2 could have originated from the Item 1. The fibres from Item 3 are composed of cotton and are different in composition from Item 1 therefore fibres from Item 3 are not from the same source as Item 1.
3WQN98	a). The questioned fibers recovered from the suspect (Item 2) were found to be consistent to those of the known section of fabric from the victim's t-shirt (Item 1) in microscopic structures, width of fibers, colour, reaction to UV light, yarn twist, yarn fold and chemical composition (Both Items 1 and 2 were identified as Rayon). Based on the above findings, in my professional opinion, Item 2 could have come from the victim's t-shirt (Item 1). b). The questioned fibers recovered from the suspect (Item 3) were found to be consistent to those of the known section of fabric from the victim's t-shirt (Item 1) in colour, reaction to UV light, yarn twist and yarn fold. However, they differ significantly in microscopic structures, width of fibers and chemical composition (Item 3 was identified as Cotton). Based on the above findings, in my professional opinion, Item 3 could not have come from the victim's t-shirt (Item 1).
4TKKWB	Fibers from item #2 recovered from the suspect could have come from the T-shirt worn by the victim item #1.
68ZZEZ	The questioned fibers from the suspect (Item 2) match in all examined criteria the fibers from the victim's t-shirt (item 1). Therefore it is likely that these fibers come from the victim's t-shirt or a textile similar to the shirt (item 1). There is no evidence that the questioned fibers from item 3 come from the victim's t-shirt.
6DNNA7	The rayon fibres recovered from the suspect (Item 2) could have originated from the victim's T-Shirt (Item 1). The Cotton fibres recovered from the suspect (item 3) could not have originated from the victim's T-shirt (item 1).
6EXVCY	Four fibre threads recovered from item 2 (attributed to the suspect) were indistinguishable from the constituent fibres of the victim's t-shirt, item 1. This finding strongly supports the proposition that the suspect had been in contact with the victim's t-shirt. Scale of support: No support, weak support, supports, strongly supports
6KLFHZ	The black fibers from the victim (Item 1) and the suspect (Item 2) were both identified as rayon fibers. As strong possibility exists that the fibers from the suspect (Item 2) could have originated from the victim's t-shirt (Item 1). The fibers from the suspect (Item 3) can be eliminated as originating from the victim's t-shirt (Item 1).
6PKU34	Item 1 is textile regenerated cellulose fibers. Item 2 is textile regenerated cellulose fibers. Item 3 is textile cotton fibers.
6TFK9F	EXHIBIT #: AGENCY #: DESCRIPTION: 1: Item 1: Known section of fabric from the victim's t-shirt. 2: Item 2: Questioned fibers recovered from the suspect. 3: Item 3: Questioned fibers recovered from the suspect. EXAMINATION & RESULTS: The above were examined visually and stereoscopically. Exhibit 1 consists of a section of black woven fabric. Exhibit 2 and Exhibit 3 each consist of four black yarns. Samples from the exhibits were taken for analytical and comparison purposes. The black fiber samples from Exhibit 1 and Exhibit 2 were examined via PLM and FTIR and were determined to be rayon. They were subsequently compared microscopically, by FTIR, and via MSP. No exclusionary differences were observed between the samples. Therefore, the section of black fabric from the victim's t-shirt (Exhibit 1), as manufactured and represented by the samples examined, could be the source of the black fibers recovered from the suspect (Exhibit 2). Other textiles composed of similar fiber content and characteristics to Exhibit 1 would also be considered possible sources. The black fiber samples from Exhibit 3 were examined via PLM and were determined to be cotton. Exhibit 3 consists of a different fiber type from Exhibit 1. Therefore, the section of black fabric from the victim's t-shirt (Exhibit 1), as manufactured and represented by the samples examined, cannot be the source of the questioned fibers recovered from the suspect (Exhibit 3). NOTES: A microscopical examination includes the use of a stereoscope as well as a compound microscope with transmitted and polarized light. A microscopical comparison refers to a side-by-side examination of features observed via a comparison microscope using transmitted light, polarized light, and fluorescence. PLM = polarized light microscopy. MSP = Microspectrophotometry. FTIR = Fourier Transform Infrared Spectroscopy.

TABLE 4

WebCode	Conclusions
7BGMNY	The fibers of item-1 and item-2 have the same characteristics. Thus the questioned fibers recovered from the suspect (item-2) could come from the victim's t-shirt (item-1). The fibers recovered from the suspect (item-3) were inconsistent with the fibers from a section of fabric from the victim's t-shirt (item-1) and could not have the same source.
7FARG4	Based on the results of FTIR analysis and on the shape and elemental composition of the fibres (as determined by SEM and EDS), fibres from item 2 (fibres recovered from the suspect) cannot be excluded from having originated from item 1 (fabric from the victim's t-shirt). Conversely, using the same analysis techniques, the fibres from item 3 (fibres recovered from the suspect) can be excluded from having originated from item 1.
7K4LE6	1. The sample received as the "Known section of fabric from the victim's t-shirt." (Item 1) is made by black rayon fibers. 2. The sample received as the "Questioned fibers recovered from the suspect" (Item 2) is made by black rayon fibers. 3. The sample received as the "Questioned fibers recovered from the suspect." (Item 3) is made by black cotton fibers. 4. According with the physical properties evaluated, the questioned fibers received as item 2 are indistinguishable from the sample received as item 1.
7NFTFA	On the basis of the items received and the examinations and testing conducted, I have formed the following opinions: I am unable to exclude the proposition that the fabric in item 1 could be a source of yarns found in item 2. I am also unable to exclude the proposition that another piece of fabric similar to that provided in item 1 could be a source of the yarns found in item 2. I am able to exclude the proposition that the fabric in item 1 could be a source of the yarns found in item 3.
8PRNXU	Considering the similar morphology, color, cross-section and behavior under fluorescence and polarized light, no significant differences were observed between Item 1 and Item 2. The analysis performed by FTIR and Raman determined that both samples are indistinguishable. Item 2 could have originated from the victim's t-shirt (Item 1). Considering the different morphology, cross-section and behavior under polarized light between Item 1 and Item 3, Item 3 couldn't have originated from the victim's t-shirt (Item 1).
8TPAMC	Item 1: This item was used for comparison purposes. Item 2: The questioned fibers are similar in visual color to the known fibers from the victim's t-shirt (Item 1). A portion of these fibers were selected for further analysis and are similar in optical properties, including fluorescence, color, and fiber type to the fibers from the victim's t-shirt. It is my opinion that the questioned fibers could have come from the victim's t-shirt or any other garment with similar fiber characteristics (Category 2B). No analysis was performed on the remaining fibers. Item 3: The questioned fibers are similar in visual color, but different in optical properties, from the known fibers from the victim's t-shirt (Item 1). It is my opinion that the questioned fibers did not originate from the victim's t-shirt (Category 5). No further analysis was performed.
8VVUDX	It was determined utilizing stereomicroscopic, polarized light microscopic, transform infrared spectroscopy and comparison microscopic examinations that the questioned black rayon fibers from item 2 and the known black rayon fibers comprising item 1 exhibit consistent characteristics. Therefore, based on those characteristics item 1 cannot be eliminated as being the source of the questioned fibers from item 2. It was determined utilizing polarized light microscopic examination that item 3 is comprised of black cotton fibers and item 1 comprised of black synthetic fibers. Therefore, item 1 can be eliminated as being the source of the item 3 questioned fibers.
93RV7W	The grey rayon fibers in Item 2 exhibit the same microscopic characteristics and optical properties as the grey rayon fibers comprising Item 1; accordingly, based on the Item 1 known sample, the Item 2 fibers are consistent with originating from Item 1 or from another item comprised of fibers which exhibit the same microscopic characteristics and optical properties. The grey fibers in Item 3 are microscopically dissimilar to the fibers comprising Item 1; accordingly, based on the Item 1 known sample, the Item 3 fibers are not consistent with originating from Item 1. No hairs were found in the submitted items. The items were examined visually using stereomicroscopy, comparison microscopy, fluorescence microscopy, and polarized light microscopy, and instrumentally using microspectrophotometry and infrared spectroscopy, as appropriate.

TABLE 4

WebCode	Conclusions
947FY7	<p>The questioned yarns recovered from the suspect (Item 2, Item 3) were examined and compared to a known section of fabric from the victim's shirt (Item 1) to determine if they could have originated from that source. 1 – Known section of black fabric from victim's shirt Item 1 was opened and found to contain one (1) section of black, woven fabric. Yarns and fibers were collected from the section of fabric to be used for comparison purposes. 2 – Questioned black yarns recovered from the suspect Examination of Item 2 revealed the presence of four (4) black yarns. These black yarns were examined and compared to the black yarns comprising the section of black fabric in Item 1 and were found to be consistent in color, construction, size, and appearance. Macroscopic and microscopic examinations and comparisons of at least one-hundred and forty-seven (147) black rayon fibers comprising the black yarns revealed that they are consistent in color, appearance, fiber type and microscopic characteristics with the black rayon fibers comprising the black fabric. Further instrumental examination and comparison of twenty-eight (28) black rayon fibers comprising the black yarns revealed that they are consistent with the black rayon fibers comprising the section of black fabric in Item 1 and therefore could have originated from that source. 3 – Questioned black yarns recovered from the suspect Examination of Item 3 revealed the presence of four (4) black yarns. These black yarns were examined and compared to the black yarns comprising the section of black fabric in Item 1 and were found to be different in appearance. It is therefore concluded that these black yarns recovered from the suspect could not have originated from the section of black fabric.</p>
97XCNZ	<p>Item 2 fibers could be originated from Item 1 fabric. Item 3 fibers are not be originated from Item 1 fabric.</p>
98PZW3	<p>1. Examination of Exhibit 1 (Known section of fabric from the victim's t-shirt) disclosed the presence of rayon fibers. Examination of Exhibit 2 (Questioned fibers recovered from the suspect) disclosed the presence of rayon fibers. Examination of Exhibit 3 (Questioned fibers recovered from the suspect) disclosed the presence of cotton fibers. 2. Comparative examinations of Exhibit 1 with Exhibit 2 disclosed them to be consistent in their physical characteristics and chemical characteristics. As a result of these findings, the fibers from Exhibit 2 could have originated from Exhibit 1, or another source with the same characteristics. 3. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. 4. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source. 5. Comparative examinations of Exhibit 1 with Exhibit 3 disclosed them to be inconsistent in their physical characteristics and chemical characteristics. As a result of these findings, the fibers from Exhibit 3 could not have originated from Exhibit 1.</p>
9WMA3Z	<p>1. The constituent fibers from Item 1 were identified as black rayon. Item 2 and Item 3 were identified as black rayon and black cotton, respectively. 2. Item 2 were indistinguishable from Item 1 in microscopic characteristic, color, and chemical composition. Item 2, the questioned fibers could have come from Item 1.</p>
ATKQFR	<p>Items 2 and 3 are questioned fiber samples recovered from the suspect. These fibers were submitted for comparison with Item 1, known fabric from the victim's T-shirt, to determine if Item 1 can be eliminated or included as a source of Items 2 and 3. Fibers from Items 1, 2, and 3 were examined visually by stereomicroscopy and analyzed by polarized light microscopy, fluorescence microscopy, infrared spectroscopy, microspectrophotometry, and scanning electron microscopy with energy dispersive spectrometry. Questioned black manufactured fibers in Item 2 correspond in fiber type, microscopic characteristics, infrared spectra, color, and elemental composition to the black manufactured fibers that comprise the known T-shirt, Item 1. These fibers are consistent with rayon. The compared fiber items are consistent in all measured physical properties and chemical composition and could have originated from the same source or another source having the same characteristics. (Type III Association) Questioned black natural fibers in Item 3 are different in color and fiber type compared to the black manufactured fibers from the T-shirt, Item 1. Therefore, the questioned fibers did not originate from the T-shirt. The questioned fibers are consistent with cotton. (Elimination)</p>
AWK843	<p>1. The following is the opinion of the undersigned: a. Q1 (Fibers 1 and 2) could have originated from the source (Laboratory item #1) represented by K1 (Fibers 1 and 2) or from another source exhibiting all of the same analyzed characteristics. No conclusions are reached about the remaining Q1 or K1</p>

TABLE 4

WebCode	Conclusions
	fibers. b. Fiber Q2 could not have originated from the source (Laboratory item #1) represented by fibers K1. K1 fibers are from Lab item #1 Q1 fibers are from Lab item #2 Q2 fibers are from Lab item #3
AXCXXZ	[No Conclusions Reported.]
B2CAUZ	The findings provide strong support for the fibers from Item 1 and Item 2 belonging to the same class/type of fiber. The findings provide strong support for the fibers from Item 1 and Item 3 do not belonging to the same class/type of fiber.
BHZM78	Conclusions: It was determined that no significant differences were observed in the microscopic properties and refractive index. The questioned fibers of Exhibit 2 could have originated from the same source represented by the fibers of Exhibit 1 or another source of manufactured fibers with the same physical and microscopic properties. It was determined that the unidentified synthetic manufactured fibers of Exhibit 3 exhibited significant differences in the microscopic and physical properties and it could not have originated from the same source as the manufactured fibers from Exhibit 1.
BN6HRR	Examinations: Visual examination, stereomicroscopy, polarized light microscopy, fluorescence microscopy, infrared spectroscopy (IR), microspectrophotometry (MSP), cross-sectioning Information: Questioned dark-colored threads were reportedly collected from the suspect (Items 2 and 3). A known fabric sample was reportedly collected from the victim's t-shirt (Item 1) for comparison to the questioned fibers. Results: The questioned threads from Item 2 were similar in all tests performed to the known fibers from Item 1. Additionally, Items 1 and 2 were both composed of rayon fibers. In the opinion of the undersigned, the questioned fibers from Item 2 came from either the victim's t-shirt as represented by Item 1 or another source with similar characteristics (Level 3 – Association). The questioned threads from Item 3 were dissimilar in microscopic characteristics to the known fibers from Item 1. The fibers from Item 3 were confirmed to be cotton. The victim's t-shirt as represented by Item 1 is excluded as a source of the questioned fibers from Item 3 (Elimination). (Fiber Association Scale inserted here). [Association scale was not included with the report.]
BUQHYZ	Black rayon fibers comprising Item 2 exhibit the same microscopic characteristics and optical properties as the black rayon fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1, or another source comprised of fibers with the same microscopic characteristics and optical properties. Black cotton-like fibers comprising Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from Item 1. The specimens were examined using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier-transform infrared spectroscopy, where appropriate.
C4DUU6	Item 1 consists of a black woven fabric swatch composed of rayon fibers. Item 2 consists of four black threads composed of rayon fibers. Item 3 consists of four black threads composed of cotton fibers. The rayon fibers from Items 1 (Known from Victim's T-shirt) and 2 (Questioned from Suspect) are similar in macroscopic appearance, microscopic characteristics (PLM), and chemical composition (FTIR). The victim's T-shirt or another item composed of the same fabric could be the source of these fibers sourced from the suspect. The rayon fibers from Item 1 and the cotton fibers from Item 3 (Questioned from Suspect) are dissimilar in macroscopic appearance and microscopic characteristics (PLM). The victim's T-shirt is not the source of the cotton fibers source from the suspect.
CEUG7R	Questioned fibers reportedly recovered from the suspect (Item 2 and Item 3) were examined and compared to fibers of a known section of fabric reportedly from the victim's t-shirt (Item 1) to determine if this t-shirt is a possible source of these questioned fibers. Stereoscopic examination of Item 2 revealed four strands of black synthetic yarn. Stereoscopic examination of Item 3 revealed four strands of black natural yarn. Item 1, swatch of black woven fabric material, was comprised of black synthetic yarns. The questioned synthetic fibers reportedly recovered from the suspect (Item 2) were similar to the known fibers from the t-shirt (Item 1) based on all examinations performed. These questioned fibers and the known fibers were determined to be comprised of black rayon fibers. In the opinion of the examiner, these questioned fibers originated either from the t-shirt as represented by Item 1 or from another indistinguishable source. Because other fiber sources have been manufactured that would also be

TABLE 4

WebCode	Conclusions
	indistinguishable from the submitted evidence, an individual source cannot be determined. (Level 3-Association) The questioned natural fibers reportedly recovered from the suspect (Item 3) were dissimilar to the known fibers from the t-shirt (Item 1) based on fiber type and microscopic properties. In the opinion of the undersigned, these questioned fibers did not originate from the t-shirt as represented by Item 1. (Elimination)
D96KF8	Items 1-3 were examined stereoscopically, microscopically, and instrumentally using Fourier Transform Infrared Spectroscopy. Item 2 fibers (recovered from suspect) were consistent with fiber samples from item 1 (known t-shirt fabric) with respect to stereoscopic characteristics (physical appearance), microscopic characteristics (including color, diameter) and fiber type consistent with manufactured rayon fibers. This indicates that item 2 could have originated from item 1 or an item that is indistinguishable in all assessed examinations and analyses. No statistical or numerical probabilities can be applied to the conclusions of this report. Item 3 fibers (recovered from suspect) were not consistent with fibers examined from item 1. Item 3 samples were consistent with vegetable/cotton type fibers.
DCKT47	The fibers from the known fabric (Item 1) and the questioned fibers from the suspect (Item 2) exhibit similarities in microscopic characteristics (relative to the mounting medium) and chemical composition. These questioned fibers could have originated from the victim's shirt. The fibers from the known fabric (Item 1) are composed of rayon. The questioned fibers from the suspect (Item 3) are composed of cotton. The questioned fibers in Item 3 did not originate from the victim's shirt.
DLD4D2	Item 2 could have originated from item 1, or another source comprised of fibers that exhibit the same physical, chemical, microscopic, and optical properties. Black regenerated cellulosic fibers from item 2 exhibited the same physical, chemical, microscopic, and optical properties as fibers comprising item 1. Item 3 and item 1 were excluded as being from the same source. Item 3 was composed of black cotton fibers and item 1 was composed of black regenerated cellulosic fibers.
DM6Z3V	[No Conclusions Reported.]
DQ6987	1. Comparative examinations of Exhibit 001 (Fibers that compose the known section of the victim's shirt) with Exhibit 002 (Questioned fibers recovered from the suspect) disclosed them to be consistent in their physical characteristics and chemical characteristics. As a result of these findings, Exhibit 002 could have originated from Exhibit 001 or another source with the same characteristics. 2. Comparative examinations of Exhibit 001 (Fibers that compose the known section of the victim's shirt) with Exhibit 003 (Questioned fibers recovered from the suspect) disclosed them to be inconsistent in their physical characteristics and chemical characteristics. As a result of these findings, Exhibit 003 could not have originated from Exhibit 001. 3. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source. 4. Examination of Exhibits 001 and 002 disclosed the presence of rayon fibers. Examination of Exhibit 003 disclosed the presence of cotton fibers.
DQMJM	Item 2 is consistent with item 1 Item 3 is not consistent with item 1
E7T3XM	The fibers Item 2 found on the suspect match the fibers Item 1 (t-shirt of the victim).
EAREUM	Microscopic and instrumental (UV-Visible Microspectrophotometry, FTIR) examination and comparison of the questioned fibers from Item #2 with the known fibers composing Item #1 yielded the following results and conclusions: The structure of the Item #2 yarns are consistent to the structure of the yarns removed from Item #1. Fibers Q1 are consistent with the K1 fibers, with respect to their physical characteristics and optical properties. Fibers Q1.1 (subset of Q1) are consistent with the K1.1 (subset of K1) fibers with respect to their chemical composition. Therefore, the Q1.1 fibers (Item #2) could have originated from the source (Item #1) represented by the K1.1 fibers or from another textile source composed of fibers that exhibit all of the same analyzed characteristics. No conclusions are reached regarding the remaining Q1 and K1 fibers. Microscopic examination and comparison of the questioned fibers from Item #3 with the known fibers composing Item #1 yielded the following results and conclusions: Fibers Q2 are different from the K1 fibers with respect to their physical characteristics and

TABLE 4

WebCode	Conclusions
	optical properties. Therefore, the Q2 fibers (Item #3) could not have originated from the source (Item #1) represented by the K1 fibers. Note: Textile fibers are mass produced and it is not possible to state that a questioned fiber originated from a particular textile source to the exclusion of all other materials composed of fibers that exhibit the same physical characteristics and chemical composition.
EYUJU7	Item 1: In the sample analyzed, black rayon fiber standards from the cutting of black fabric were analyzed for comparison to unknown black fibers Item 2 and Item 3. Item 2: Multiple black rayon fibers were found. In the sample analyzed, the unknown fibers recovered from the suspect either originated from the fiber standard (Item 1) from the victim's t-shirt or another source of fibers possessing the same distinct physical, chemical, and optical characteristics. Item 3: Multiple black cotton fibers were found. In the sample analyzed, the unknown fibers recovered from the suspect and the fiber standard (Item 1) from the victim's t-shirt are not the same in physical, chemical, and optical characteristics. The unknown fibers from the suspect could not have originated from the standard.
F7PZLN	The questioned fibers recovered from the suspect (Item 2) could have originated from the victim's t-shirt (Item 1). The questioned fibers recovered from the suspect (Item 3) could not have originated from the victim's t-shirt (Item 1).
FN9JVN	The results support that the fibers (Item 2) found on the suspect come from the t-shirt (Item 1) worn by the victim. The fibers (Item 3) found on the suspect do not come from the t-shirt (Item 1) worn by the victim
FVRY8Y	The complainant's shirt, as represented by item 1, could not be eliminated as a possible source of the black rayon yarns recovered from the suspect (item 2). As such, the black rayon yarns recovered from the suspect (item 2) either came from the complainant's shirt (item 1) or from another source that is indistinguishable in yarn construction, microscopic appearance, composition, and colour. The complainant's shirt, as represented by item 1, was eliminated as a possible source of the questioned fibres recovered from the suspect (item 3).
G8Z39M	Based on the analyses conducted, no exclusionary differences in microscopic properties, chemical composition (determined by FTIR), or cross-sectional shape were found to exist between the fully analyzed thick rayon fiber from item 2 and the analyzed rayon fibers from item 1 (the known sample). The tested fiber from item 2 could have originated from the same source as represented by the known fabric section (item 1), or from another textile source with fibers exhibiting all of the same analyzed characteristics. The cotton fibers from item 3 are different from the analyzed rayon fibers in directions A and B from item 1. Based on these differences in fiber type, the fibers from item 3 could not have originated from the source represented by item 1.
G9A8JP	Item 1, fabric from the victim's t-shirt, contains manufactured fibers, identified as rayon. Item 2, fibers recovered from the suspect, contains manufactured fibers, identified as rayon. Item 3, fibers recovered from the suspect, contains vegetable fibers, identified as cotton.
HQT6M3	Item 1 is a piece of black fabric, approximately 5cm x 5cm composed of rayon fibers. Item 2 is four yarns/threads composed of rayon fibers. Item 3 is four yarns/threads composed of cotton fibers. The rayon fibers in Item 2 are similar in all examined characteristics to the rayon fibers in Item 1. Thus, the fibers in Item 2 could have originated from Item 1 or a similarly constructed fabric. The cotton fibers in Item 3 could not have originated from Item 2.
HZWFTR	Item 2 could have been generated from Item 1. Item 3 could not have been generated from Item 1.
J4QVJQ	In my opinion the findings are as I would expect if the fibres found on the suspect (item 2) have originated from the t shirt of the victim. The fibres found on the suspect (item 3) could not have come from the t shirt of the victim.
JKXT3P	ALL OF ITEMS HAVE THE SAME DYE.
JNX27Z	The fibers in item 2 could not be distinguished from the fibers in the known sample of shirt (Item 1). The fibers in item 2 were similar with respects to construction (of the yarns), color, dye, polarized light optical features, physical properties (such as diameter, cross section, crimp etc) and chemical composition

TABLE 4

WebCode	Conclusions
	(rayon). The fibers from item 1 can not be ruled out as a possible source of the fibers in item 2. It is possible that the fibers in item 2 originated from the known sample of fabric or another garment exhibiting the same properties. Item 3 was not similar to the known sample in item 1.
JYWYUZ	The questioned fibres recovered from the suspect (Item 2) could have originated from the victim's t-shirt (Item 1). The questioned fibres recovered from the suspect (Item 3) did not originate from the victim's t-shirt (Item 1).
K9ZCQU	Item 1 "Known section of fabric from the victim's t-shirt" contained a swatch (approximately 5cm x 5cm) of black fabric composed of rayon. Item 2 "Questioned fibers recovered from the suspect" contained several black rayon threads. Item 3 "Questioned fibers recovered from the suspect" contained several cotton threads. In relation to appearance, colour, chemical composition and dye extraction properties, the black rayon fibers recovered from the suspect (item 2) was found to be indistinguishable to the black rayon fibers from the victim's t-shirt (item 1). Therefore these two fibre samples may share a common origin. The black fibers recovered from the suspect (item 3) were composed of cotton whereas the black fibers from the victim's t-shirt were composed of rayon. Therefore the recovered fibers could not have originated from the t-shirt.
KFYYHU	The items were examined using the following methods as appropriate: stereomicroscopy, transmitted and polarized light microscopy, comparison microscopy, Fourier transform infrared spectroscopy and microspectrophotometry. Item 1 is a fabric consisting of two threads, both comprised of rayon fibers. Item 2 contains four loose threads; the threads are comprised of rayon fibers. Item 3 contains four loose threads; the threads are comprised of cotton fibers. Rayon fibers from the victim's t-shirt (item 1) exhibit the same physical, chemical, microscopic and optical properties as the rayon fibers from the suspect (item 2); therefore, these fibers from the suspect originated from the t-shirt or another textile source comprised of fibers that exhibit the same physical, chemical, microscopic and optical properties. Rayon fibers from the victim's t-shirt (item 1) and cotton fibers from the suspect (item 3) are dissimilar in microscopic properties; therefore these items do not share the same source.
KP93TY	1. Examination of the fabric of Exhibit 1 (known section of fabric from victim's t-shirt) disclosed the presence of black rayon fibers. 2. Comparative examination of the black rayon fibers from Exhibit 1 with the black rayon fibers from Exhibit 2 (questioned fibers recovered from the suspect) disclosed them to be consistent in their physical characteristics and chemical characteristics. As a result of these findings, Exhibit 2 could have originated from the fabric in Exhibit 1 or another source of fibers with the same characteristics. 3. Comparative examination of the black rayon fibers from Exhibit 1 with the black cotton fibers from Exhibit 3 (questioned fibers recovered from the suspect) disclosed them to be inconsistent in their chemical characteristics. As a result of these findings, Exhibit 3 could not have originated from the fabric in Exhibit 1. 4. It should be noted that a fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to be consistent with a particular source.
KT9EQK	The known fibers collected from the victim's shirt (Item #1) are similar in physical, optical, and chemical properties to the black colored fibers recovered from the suspect (Item #2). The fibers from the victim's shirt (Item #1) or another material with similar fiber characteristics could have been the source of the fibers recovered from the suspect (Item #2). The known fibers collected from the victim's shirt (Item #1) were excluded as a possible source to the black colored fibers recovered from the suspect (Item #3). Differences in physical, optical, and chemical properties were observed. Note, additional techniques used to resolve minor color/dye differences were not available at the time of this report that could either support or refute a common source determination.
KUGQ7Z	Physical, microscopic, and instrumental comparison of the black modal fibers from Item 2 with the black fibers in construction of Item 1 revealed them to be consistent with respect to optical properties, color, and fiber type. Therefore, the fibers recovered from the suspect in Item 2 could have come from the victim's t-shirt in Item 1 or another source consistent with these properties. Physical and microscopic comparison of the black cotton fibers from Item 3 with the black fibers in construction of Item 1 revealed them to be inconsistent with respect to optical properties and fiber type. Therefore, the fibers recovered from the suspect in Item 3 could not have come from the victim's t-shirt in Item 1.

TABLE 4

WebCode	Conclusions
LEMJNT	Item #2 (questioned) compared to Item #1 (known)-No significant differences in macroscopic, microscopic, or chemical characteristics were observed between the two items. The fibers from Item #2 could have originated from the same source as the fibers from Item#1. Item#3 (questioned) compared to Item #1 (known)-Significant differences were observed in microscopic and chemical characteristics between the two items. The fibers from Item #3 are excluded as originating from the same source as the fibers from Item #1.
LZ27CJ	The black rayon fibers recovered from 1-2 are consistent with the fibers which compose the swatch in Item 1-1; therefore, these fibers could have originated from the t-shirt where the standard was retrieved from in Item 1-1. The black cotton fibers observed in Item 1-3 are dissimilar to the fibers which compose Item 1-1; therefore, no association can be made between items 1-1 and 1-3.
MA8BZT	Item 1 (control fabric) comprised a piece of woven black fabric, approximately 5cm by 5cm. Both the warp and weft yarns were composed solely of black rayon fibres. Item 2 (questioned fibres from suspect) comprised 4 black yarns. All 4 yarns were composed solely of black rayon fibres. The rayon fibres from the yarns were indistinguishable in colour (as determined by microspectrophotometry) and appearance via brightfield, fluorescence and polarized light microscopy from the rayon fibres from yarns from control fabric Item 1. This supports the proposition that the 4 yarns recovered from the suspect could have originated from the fabric represented by control Item 1. Item 3 (questioned fibres from suspect) comprised 4 black yarns. All 4 yarns were composed solely of black cotton fibres and could not have originated from the fabric represented by control Item 1.
MALWBF	The questioned fibers from Item 3 could not have originated from Item 1, represented by the fabric swatch. The questioned fibers from item 1.2 could have originated from item 1.1 (as represented by the submitted fabric swatch) or from another textile source with fibers exhibiting all of the same analyzed/measured characteristics.
MBGFBW	Item 1: This item was used as a comparison standard. Please note this item is comprised of rayon fibers. Item 2: Questioned fibers from the suspect This item was determined to be rayon fibers which are similar in physical properties, optical properties, fluorescence, color, and fiber type to the known fibers from the victim's sweater (Item 1). It is our opinion that these fibers could have come from the victim's sweater or any other textile with similar characteristics. Item 3: Questioned fibers from the suspect This item was determined to be cotton fibers which are dissimilar in fiber type to the known fibers from the victim's sweater (Item 1). It is our opinion that these fibers did not come from the victim's sweater.
MG47XR	The known section of fabric from the victim's t-shirt in Item 1 was found to comprise black rayon fibres. The questioned fibres in Item 2 from the suspect were found to comprise black rayon fibres. The fibres in Item 2 were found to agree in fibre type, colour and microscopic appearance under various lighting conditions with the black rayon fibres of the known section of fabric from the victim's t-shirt in Item 1. The findings indicated the questioned fibres from Item 2 could have come from the same source as those from Item 1. The questioned fibres in Item 3 from the suspect were found to comprise black cotton fibres. The fibres in Item 3 were found to differ in fibre type from the black rayon fibres of the known section of fabric from the victim's t-shirt in Item 1. The findings indicated the questioned fibres from Item 3 did not originate from the same source as those from Item 1.
MLX3MH	Items 1 and Item 2 consist of manufactured rayon fibers. No variations were observed in the morphological structure and the color of the manufactured rayon fibers present in Item 1 and Item 2 across all tested features. Questioned fibers recovered from the suspect, marked as Item 2, could have originated from the victim's t-shirt (Item 1), while questioned fibers marked as Item 3 couldn't have originated from a t-shirt (Item 1).
NA6ZJG	The Interpretations & Opinions stated below are based solely on the representative samples analyzed. Microscopic examination & instrumental analysis of representative fibers in Items 1 and 2 revealed dark gray rayon fibers. Microscopic examination of representative fibers in Item 3 revealed dark gray cotton fibers. Examination and comparison of rep. fibers in Items 1 and 2 were found to be similar in all measured physical, microscopic, chemical, and color properties. They could have come from the same source or any other source with the same properties. Examination and comparison of rep. fibers in Items 1 and 3 were found to be dissimilar in physical and microscopic properties. They could not have come

TABLE 4

WebCode	Conclusions
	from the same source.
NTVEVK	The questioned fiber (item2) that was recovered from the suspect could have been originated from the victim's t-shirt (item1), because of their similarities in physical properties and chemical compositions. The questioned fiber (item3) that was recovered from the suspect could NOT have been originated from the victim's t-shirt (item1), because of their differences in physical properties and chemical compositions.
P94MAT	Exhibit 1 contained known fabric woven with single-ply, Z-twist yarns that were comprised of black rayon fibers. Exhibit 2 contained single-ply, Z-twist yarns that were comprised of black rayon fibers. Exhibit 3 contained single-ply, Z-twist yarns that were comprised of black cotton fibers. Comparison: The questioned yarns in Exhibit 2 were determined to be consistent in construction with the yarns comprising the known woven fabric in Exhibit 1. Additionally, the fibers comprising the yarns in Exhibit 2 were consistent in physical characteristics, optical properties and chemical composition to the fibers comprising the yarns in the Exhibit 1 fabric. The fibers and yarns in Exhibit 2 could have originated from Exhibit 1 or any other material with the same yarn construction and fiber physical characteristics, optical properties and chemical composition. (Type III Inclusion). This type of conclusion was reached because other textiles containing yarns/fibers made to the same specifications would also be indistinguishable from these yarns/fibers. The fibers comprising the yarns in Exhibits 1 and 3 differed in fiber type; therefore, they could not have originated from the same source as represented by the sample submitted (Exclusion). See the Appendix of this report for further context regarding the conclusions listed above. [Appendix not provided].
PC32WJ	The fiber recovered from the suspect(Item 2) has originated from the victim's t-shirt (Item 1). The fiber recovered from the suspect(Item 3) has not originated from the victim's t-shirt (Item 1).
PP79RF	Gray fibers that appear black in reflected light recovered from Item 2 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1 or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. Gray fibers that appear black in reflected light recovered from Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from Item 1. The specimens were examined using the following techniques as appropriate: stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier-transform infrared spectroscopy.
PQJY2J	Item 2 and Item 3 (both questioned fibres recovered from the suspect) were examined for the presence of fibres that may have originated from Item 1 (known section of fabric from the victim's t-shirt). We have identified the fibres from Item 3 as black cotton fibres that could not originate from Item 1. Microscopic and instrumental examination and comparison of the fibres in Item 1 and fibres in Item 2 revealed black rayon fibres found to be similar in microscopic, morphological and chemical properties. When analysing the colour of the fibres in Item 1 and Item 2 using UV-VIS MSP, some small differences in the colour characteristics were detected at certain number of fibres of the known sample (Item 1) and the questioned ones in Item 2 (noticeable differences in the slope of spectra in the range of wavelengths between 500 and 550 nm). In addition, fibres from Item 1 showed variations of colour within this sample. We observed variations in colour also within the fibres in Item 2 that differ from variations observed in Item 1. Therefore, we chose inconclusive as the best conclusion in case of comparison of Item 1 and Item 2.
Q2Y6DD	The black rayon fibers labeled questioned fibers recovered from the suspect, (item 2), are consistent in color, physical characteristics and chemical composition as compared to the black rayon fibers from the sample labeled known section of fabric from the victim's T-shirt, (item 1). Level III Association. The black cotton fibers labeled questioned fibers recovered from the suspect, (item 3), display differences in physical characteristics as compared to the black rayon fibers from the sample labeled known section of fabric from the victim's T-shirt, (item 1). Elimination.
QAB68P	The questioned fibers (Item 001-2) recovered from the suspect that were examined could have come from the known section of the victim's t-shirt (Item 001-1), or another textile, of the same color and type of fibers, that exhibit the same microscopic properties and chemical composition. The questioned fibers (Item 001-3) recovered from the suspect that were examined did not come from the known section of

TABLE 4

WebCode	Conclusions
	the victim's chair (Item 001-1).
QP8J8H	The examination of items 1, 2 and 3 that you submitted in relation to this case have now been completed and the results are as follows: Fibres from item 2 are indistinguishable under LPM from the constituent fibres of item 1. Fibres from item 3 are different to to the constituent fibres of item 1 and therefore can be eliminated from having originated from item 1. Items 1 and 2 will be sent to a forensic provider for further analysis in order to establish whether or not item 1 has been the source of the fibres in item 2.
QRUXWT	<p>CONCLUSIONS: The yarns recovered from the "questioned fibers recovered from suspect" (item 2) originated from the "known section of fabric from victim's t-shirt" (item 1) or another source of textile material possessing the same distinct characteristics. The yarns recovered from the "questioned fibers recovered from suspect" (item 3) did not originate from "known section of fabric from victim's t-shirt" (item 1). RESULTS: The "questioned fibers recovered from suspect" (item 2) were examined for the purpose of determining whether or not they are consistent with the known fabric in item 1. Examination of item 2 reveals the presence of 4 black yarns composed of rayon. Examination and comparison of the yarns recovered from the "questioned fibers recovered from suspect" (item 2) with the "known section of fabric from victim's t-shirt" (item 1) reveals they are consistent in construction. Further examination and comparison of fibers composing the fabric from the "known section of fabric from victim's t-shirt" (item 1) with fibers composing the "questioned fibers recovered from suspect" (item 2) reveals they are consistent in microscopic, optical, and chemical characteristics. It is therefore concluded the yarns recovered from the "questioned fibers recovered from suspect" (item 2) originated from the "known section of fabric from victim's t-shirt" (item 1) or another source of textile material possessing the same distinct characteristics. The "questioned fibers recovered from suspect" (item 3) were examined for the purpose of determining whether or not they are consistent with the known fabric in item 1. Examination of item 3 reveals the presence of 4 black yarns composed of cotton. Examination and comparison of the yarns recovered from the "questioned fibers recovered from suspect" (item 3) with known fibers of item 1 reveals they are inconsistent in microscopic characteristics. It is therefore concluded the yarns recovered from the "questioned fibers recovered from suspect" (item 3) did not originate from the "known section of fabric from victim's t-shirt" (item 1). METHODS OF ANALYSIS: Examinations were performed visually, by stereo microscopy, brightfield/polarized light comparison microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared microspectroscopy.</p>
QVRNWC	Rayon fibers from the fabric of the victim's T-shirt (Item 1) and Rayon fibers recovered from the suspect (Item 2) are similar in terms of morphological characteristics and fiber-forming polymer class.
R4HJET	The following methodologies were used in the examination of this case: visual examination, physical examination, microscopy, fluorescence, MSP, and FTIR. Examination of Lab Item # 2 (Questioned fibers recovered from the suspect) revealed the presence of four (4) black yarns, composed of rayon fibers, that were found to be consistent in color, construction, and composition with the representative Direction 1 and 2 yarns, composed of rayon fibers, comprising the fabric in Lab Item # 1 (Known section of fabric from the victim's t-shirt). Therefore, the yarns in Lab Item # 2 could have originated from the same source as the fabric in Lab Item # 1. Examination of Lab Item # 3 (Questioned fibers recovered from the suspect) revealed the presence of four (4) black yarns, composed of cotton fibers, that were found to be not consistent in composition with the representative Direction 1 and 2 yarns, composed of rayon fibers, comprising the fabric in Lab Item # 1. Therefore, the yarns in Lab Item # 3 could not have originated from the same source as the fabric in Lab Item # 1.
R9YR3T	Items 1, 2, and 3 were examined visually and using stereomicroscopy. Fibers from Items 2 and 3, and fibers composing Item 1 were examined using comparison microscopy, polarized light microscopy (PLM), and microchemical tests. Fibers from Item 2 and fibers composing Item 1 were further examined using fluorescence microscopy, Microspectrophotometry (MSP), and Fourier Transform Infrared Spectrophotometry (FTIR). Items 2 and 3 each consisted of four (4) black yarns. The Item 2 black yarns and the black yarns composing the Item 1 fabric were consistent in color and overall construction and were composed of regenerated cellulose fibers that were consistent in physical, chemical, and optical properties. Based on the yarns and fibers examined, it was concluded that the Item 2 yarns originated from either the source represented by Item 1 or a different source manufactured in the same manner

TABLE 4

WebCode	Conclusions
	<p>(Level III – Association with Discriminating Characteristics). This type of conclusion was reached because other textiles like Item 1 containing yarns and fibers produced with the same properties (type, color, microscopic characteristics, etc.) would also be indistinguishable from these fibers. It should be noted that the techniques used in this comparative analysis can typically distinguish different fibers. Based on the yarns and fibers examined, the Item 3 cotton yarns could not be associated with the yarns and fibers composing Item 1 due to differences in fiber type (Exclusion/Elimination). TERMINOLOGY KEY FOR COMPARATIVE EXAMINATIONS: Level I - Physical/Fracture Match: Physical Fit is reached when the items that have been broken, torn, or separated exhibit physical features that correspond/re-align in a manner that is not expected to be replicated. Level II - Association with Highly Discriminating Characteristics: An association in which items could not be differentiated based on the examinations conducted. Therefore, the possibility that the items came from the same source cannot be eliminated. Additionally, the items share unusual characteristics that would rarely be expected to occur in the relevant population. This is the highest degree of association that can be determined in the absence of a Physical Fit. Level III - Association with Discriminating Characteristics: An association in which items could not be differentiated based on the examinations conducted. Therefore, the possibility that the items came from the same source cannot be eliminated. Other items have been manufactured or could occur in nature that would also be indistinguishable from the submitted items and could be encountered in the relevant population. The analytical techniques used in the analysis of these items can provide high levels of discrimination among natural and manufactured materials. This is considered a high degree of association. Level IV - Association with Limitations: An association in which items could not be differentiated based on the examinations conducted. Therefore, the possibility that the items came from the same source cannot be eliminated. As compared to the categories above, this type of association has decreased evidential value. For example, the items are more commonly encountered in the relevant population, minor variations were observed, or a complete analysis was not performed due to limited characteristics or sample size. Minor variations, for certain types of examinations, could be due to factors such as contamination of the sample(s) or having a sample of insufficient size to adequately assess heterogeneity of the entity from which it was derived. Inconclusive: No conclusion could be reached regarding an association or an elimination between the items. Exclusion with Limitations: The item exhibits differences from the comparison sample that support that it did not originate from the source, as represented by the comparison sample. An Exclusion/Elimination conclusion was not reached due to limiting factors, such as possible natural or manufactured source variations. Exclusion/Elimination: The items exhibit differences that demonstrate the items did not originate from the same source.</p>
RA9WGG	<p>Item 1 and Item 2 showed fibers with smooth surface and similar polarized light, and presented similar FTIR spectrum that representing rayon or cotton. Item 3 showed similar FTIR spectrum with those of Item 1 and Item 2, but we found a fiber having rough surface and polarized light different from other two Items. We considered Item 1 and Item 2 are manufactured rayon fibers and Item 3 is a cotton fiber obtained from plants. From the analyzed results, we suspected that Item 1 was originated from Item 2.</p>
TCPMWB	<p>Dark gray rayon fibers recovered from Item 2 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. Fibers found on Item 3 are microscopically dissimilar to the fibers comprising Items 1. Accordingly, these fibers are not consistent with originating from Items 1. The items were examined visually using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier-Transform Infrared-Spectroscopy, where appropriate.</p>
TCR9TR	<p>The black rayon fibers found from the suspect (item 2) are consistent with the black rayon fibers of the victim's t-shirt (item 1). Item 2 could be originated from item 1. The black cotton fibers found from suspect (item 3) are not consistent with the black rayon fibers from victim's t-shirt (item 1). Item 3 could not be originated from item 1.</p>
TFTCKE	<p>Item 1 (exemplar fabric) is included as a possible source of item 2 based on class characteristics. Item 1 (exemplar fabric) is excluded as a possible source of item 3 based on class characteristics.</p>
TNLTQA	<p>Black/gray rayon fibers recovered from Item 2 exhibit the same microscopic characteristics and optical</p>

TABLE 4

WebCode	Conclusions
	<p>properties as the black/gray rayon fibers comprising Item 1. Accordingly, the black/gray rayon fibers from Item 2 are consistent with originating from the source of Item 1, or another item comprised of fibers exhibiting the same microscopic characteristics and optical properties. Black fibers recovered from Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from the source of Item 1. The specimens were examined using the following methods as appropriate: stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, and microspectrophotometry, and Fourier transform infrared spectroscopy.</p>
TUA8ZB	<p>Items 2 and 3 were compared to Item 1. The fibers composing the victim's t-shirt, Item 1, and the fibers recovered from the suspect, Item 2, are rayon fibers. They are consistent with each other in their physical appearance, microscopical characteristics, optical properties, chemical composition and instrumental color characteristics. Therefore, the fibers from the suspect, Item 2, originated from the victim's t-shirt, or from another textile source with the same analyzed characteristics. The fibers from the suspect, Item 3, are cotton fibers. They are different in fiber type from the fibers composing the victim's t-shirt and, therefore, did not originate from the victim's t-shirt as represented by Item 1.</p>
UEBR69	<p>The submitted items were examined and analyzed by stereo microscope and polarized light comparison microscope. The black fibers found in Item 1 composed of synthetic fiber, polyester. The black fibers found in Item 2 composed of synthetic fiber, polyester. The black fibers found in Item 3 composed of natural fiber, cotton. The fibers found in Item 3 exhibited different microscopic appearance and physical characteristic as Item 1. Therefore, fibers as Item 3 recovered from the suspect could not have originated from the victim's t-shirt. The fibers found in Item 2 exhibited similar microscopic appearance and physical characteristic as Item 1. Therefore, fibers as Item 2 recovered from the suspect could have originated from the victim's t-shirt.</p>
UJ7L3A	<p>The grey rayon fibers from Item 2 have the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from the same source as the Item 1 known sample or from another source comprised of fibers with the same microscopic characteristics and optical properties. The Item 3 fibers are microscopically dissimilar to the fibers comprising Item 1. Accordingly, the Item 3 fibers are not consistent with originating from the same source as the Item 1 known sample. The specimens were examined visually using stereomicroscopy, comparison microscopy, polarized light microscopy, and fluorescence microscopy, and instrumentally using microspectrophotometry and infrared spectroscopy, where appropriate.</p>
ULCYRN	<p>The yarns consisting of black rayon fibers in Item 2 were indistinguishable from the yarns consisting of black rayon fibers in Item 1 in construction, color, fiber type, and microscopic characteristics (Type 3 Association).* The yarns consisting of black cotton fibers in Item 3 were different from the yarn consisting of black rayon fibers in Item 1 (Elimination).***This means that the questioned fibers recovered from the suspect in Item 2 could have come from the known section of fabric from the victim's t-shirt. **This means that the questioned fibers recovered from the suspect in Item 3 did not come from the known section of fabric from the victim's t-shirt. TRACE INTERPRETATION SCALE: Type 1 Association: Physical Fit—The compared items exhibit physical features that demonstrate they were once part of the same object. Type 2 Association: Association with Distinctive characteristics—Items are consistent in all measured and observed physical properties, chemical composition and/or microscopic characteristics, and therefore could have originated from the same source. The items further share distinctive characteristics that would not be typically encountered in the relevant population. Type 3 Association: Association with Conventional characteristics—Items are consistent in all measured and observed physical properties, chemical composition and/or microscopic characteristics, and therefore could have originated from the same source. Because other items have been manufactured or are naturally occurring that would also be indistinguishable from the submitted evidence, an individual source cannot be determined. Type 4 Association: Association with limited characteristics and/or examination (1) Items are consistent in all measured and observed physical properties, chemical composition and/or microscopic characteristics, and therefore could have originated from the same source. This type of evidence may be commonly encountered in the environment or may have limited comparative value. Or (2) The comparison between items may be categorized as a Type 4 Association if the association is limited by the inability to perform a complete analysis or if minor variations are observed in the examination results. Inconclusive—No conclusion could be reached regarding an</p>

TABLE 4

WebCode	Conclusions
	association or an elimination between the items. Elimination—Items exhibit differences in one or more of the following: physical properties, chemical composition, or microscopic characteristics and therefore did not originate from the same source. Non-Association—The items were different in physical properties, chemical composition, and/or microscopic characteristics, indicating that the items did not originate from the same source. However, these differences were insufficient for a definitive elimination.
UPCANN	The fabric from the t-shirt (Item 1) was found to be composed of black rayon fibers. The black rayon fibers from the t-shirt (Item 1) were found to be similar in color, physical characteristics, microscopic characteristics, and chemistry in comparison to the questioned black rayon fibers recovered from Item 2. The black rayon fibers recovered from Item 2 could have originated from the black rayon fabric from the t-shirt (Item 1), or from any other source of black rayon fibers with similar color, physical characteristics, microscopic characteristics, and chemistry. The questioned fibers from Item 3 were found to be black cotton fibers. The black cotton fibers from Item 3 are different than the black rayon fibers composing the t-shirt fabric (Item 1) and could not have originated from the same source. Samples collected and analyzed during the examination and analysis of the items in this case (ex. slides) have been returned to and retained with the original item. Items 1, 2, and 3 were examined visually and using stereomicroscopy, polarized light microscopy, comparison polarized light microscopy, Fourier transformed infrared spectroscopy and microspectrophotometry.
UU76NB	1. Based on microscopic characteristics and chemical composition, a. the control fabric in Item 1 was found to consist of rayon fibres. b. the yarns in Item 2 were found to consist of rayon fibres. c. the yarns in Item 3 were found to consist of cotton fibres. 2. Based on yarn characteristics and microscopic characteristics, fluorescence, instrumental colour analysis and chemical composition of fibres constituting the yarns, the yarns in Item 2 could have originated from Item 1, or other sources containing yarns with similar characteristics. 3. Based on differences in yarn characteristics, microscopic characteristics (morphology) and chemical composition of fibres constituting the yarns, Item 3 did not originate from Item 1.
UU78DF	Items 2 and 3 don't have the same source than item 1.
VWQBKD	Item 2 fibers could be originated from Item 1 fabric. Item 3 fibers are not be originated from Item 1 fabric.
WAVUWD	1. According to the results of microscopic examination, cross-section, FTIR, PY-GCMS and SEM/EDS, the compositions of Item 2 is similar to those of Item 1. 2. The Item 3 component is dissimilar to Item 1.
X6TG66	Dark blue rayon fibers recovered from Item 2 exhibit the same microscopic characteristics and optical properties as the dark blue rayon fibers comprising Item 1. Accordingly, these fibers are consistent with originating from the same source as Item 1 or another source comprised of fibers that exhibit the same microscopic characteristics and optical properties. Dark blue natural fibers recovered from Item 3 exhibit dissimilar microscopic characteristics to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from the same source as Item 1. The specimens were examined visually and using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry, and Fourier transform infrared spectroscopy, where appropriate.
X6V337	The black rayon fibers in Item# 1-2 are similar to the black rayon fibers in Item# 1-1 and therefore, the black rayon fibers in Item# 1-2 could have originated from the same source as Item# 1-1. The black cotton fibers in Item# 1-3 are dissimilar to the black rayon fibers in Item# 1-1.
XCF69M	The black rayon yarns recovered from the suspect (Item 2) are associated to the known section of fabric from the victim's t-shirt (Item 1) upon comparison of optical, physical, and chemical properties and either originated from this item or from another item with same characteristics (Level III Association). The black cotton yarns recovered from the suspect (Item 3) did not originate from the known section of fabric from the victim's t-shirt (Item 1) due to differences in fiber type (Elimination).
YJBMZ6	On examination, I found: i. The questioned fibers recovered from the suspect (Item 2) to be similar to the known section of fabric from the victim's t-shirt (Item 1). i. The questioned fibers recovered from the suspect (Item 3) to be dissimilar to the known section of fabric from the victim's t-shirt (Item 1). Therefore, I am of the opinion that: i. The questioned fibers recovered from the suspect (Item 2) could

TABLE 4

WebCode	Conclusions
YTLPL7	<p>have originated from the known section of fabric from the victim's t-shirt (Item 1). i. The questioned fibers recovered from the suspect (Item 3) did not originate from the known section of fabric from the victim's t-shirt (Item 1).</p>
YTLPL7	<p>Questioned fibers recovered from the suspect (Item 2) are not differentiated from known section of fabric from the victim's t-shirt (Item 1). Fibers from Item 2 can come from the fabric of the victm's t-shirt (Item 1) or from another textile material with the same characteristics. Questioned fibers recovered from the suspect (Item 3) are differentiated from known section of fabric from the victim's t-shirt (Item 1). Fibers from Item 3 don't come from the fabric of the victm's t-shirt (Item 1).</p>
YWEXL7	<p>The four black threads recovered from Item 2 (Your Item 2) have the same color, construction, and composition as the black threads that comprise the warp and weft of the Item 1 fabric sample (Your Item 1). Accordingly, the black threads are consistent with originating from the victim's t-shirt Item 1 was sampled from or from another item with the same color, construction, and composition. The four black threads recovered from Item 3 (Your Item 3) differ in macroscopic construction and are comprised of a different fiber type than the black threads comprising the warp and weft of the Item 1 fabric sample (Your Item 1). Accordingly, the black threads from Item 3 are not consistent with having originated from the same source as Item 1. The specimens were examined visually using stereomicroscopy, comparison microscopy, fluorescence microscopy, and polarized light microscopy, and instrumentally using microspectrophotometry and infrared spectroscopy, where appropriate.</p>
Z326J6	<p>Grey rayon fibers recovered from Item 2 exhibit the same microscopic characteristics and optical properties as the fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. Grey cotton fibers recovered from Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from Item 1.</p>
Z34PEK	<p>The questioned rayon fibers in Item 2 are consistent with the known rayon fibers in Item 1 on the basis of color, delusterant, approximate diameter, and organic composition. Therefore, the questioned fibers in Item 2 could have originated from the known fibers in Item 1. The questioned rayon fibers in Item 3 are not consistent with the known rayon fibers in Item 1 on the basis of delusterant, approximate diameter, and organic composition.</p>
ZBDETJ	<p>Items 1, 2 and 3 were examined visually and microscopically. Item 3 was identified as cotton. Items 1 and 2 were also examined by solubility and by Fourier Transform infrared spectroscopy (FTIR). Items 1 and 2 were identified as rayon. The questioned fibers from item 2 were compared to the known fibers from item 1 and were found to be consistent with respect to color, morphology, optical properties, and fiber type. Based on these findings, it is the opinion of this analyst that the questioned fibers examined from item 2 could have originated from item 1 or any other source exhibiting the same analyzed characteristics. The questioned fibers from item 3 were compared to the known fibers from item 1 and were found to be different with respect to morphology and fiber type. Based on these findings, it is the opinion of this analyst that the questioned fibers from item 3 and the known fibers from item 1 did not originate from the same source.</p>

Additional Comments

TABLE 5

WebCode	Additional Comments
3GCHX8	In casework, if presented with threads of fibres, we would assess the control item in order to determine if threads of fibres were being shed, for example from a damaged area. If the suspect had made a comment regarding the allegation, the findings could be evaluated in terms of activity.
8TPAMC	Category 2B - association with conventional characteristics. Category 5 - elimination/exclusion.
BHZM78	The FTIR used for fiber identification was out of service. Microspectrophotometer was not used due to the color of the fibers.
CEUG7R	Association Scale would also be included.
FN9JVN	Item 1 is assumed to be a representative sample from the t-shirt.
G9A8JP	This laboratory does not report fiber comparisons.
J4QVJQ	fibres not usually transferred as a thread unless damage occurs
JYWYUZ	Conclusions are based on the samples provided. It is unusual to recover threads in cases unless the incident involved the snagging of material on a window for example. Generally casework involves trace fibres. In casework we would evaluate with two propositions e.g. The above findings have been evaluated as follows: The fibres found on the suspect originated from the victims t-shirt. The fibres found on the suspect originated from an unknown source. The findings provide strong support for the view that the fibres (Item 2) found on the suspect originated from the victims t-shirt rather than from an unknown source. I have chosen the above phrase from the following scale: weak support, moderate support, moderately strong support, strong support, very strong support, extremely strong support. The findings also show that the fibres (Item 3) found on the suspect did not originate from the victims t-shirt.
K9ZCQU	This laboratory does not have access to a microspectrophotometer and therefore any colour comparisons undertaken are subjective.
MALWBF	Because textile materials are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other textile materials composed of fibers which exhibit the same chemical and optical properties.
QP8J8H	LPM & visual examination only available within force
TCPMWB	Microscopic examination of fibers is accomplished by using one or more analytical techniques including stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, and instrumentally using microspectrophotometry and Fourier transform-infrared spectroscopy. The microscopic characteristics and optical properties determined by these techniques are used for the examination and comparison of fibers. Fibers can differ as to type (e.g., rayon, cotton), color, shape, size, microscopic features (e.g., delustrant, voids) and optical properties (e.g., refractive index, sign of elongation). These are characteristics that may associate fibers with a group of items, but never to a single item to the exclusion of all others. However, even fibers with many similar properties may be excluded as originating from the same source by using the identified analytical methods. The characteristics and optical properties of the fiber(s) are used as comparison criteria. When the characteristics and optical properties of a recovered fiber(s) are the same as a known sample, the recovered fibers are consistent with originating from the source of the known sample, or from another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. However, due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a fiber selected at random to be consistent with a particular item. The inability to associate persons/items through a microscopic fiber examination does not necessarily mean the persons/items of interest had no contact. A number of factors can produce this result, including: 1) Fiber evidence may not have transferred. 2) Fibers that did transfer may have been lost prior to submission to the laboratory. 3) The fibers transferred or the known sample submitted may not be representative of the source. 4) The fibers may be from a different source.

TABLE 5

WebCode	Additional Comments
XCF69M	<p>Level of Association: Level I Association: A physical fit; items physically fit and/or align one another by way of corresponding surface characteristics. The associated items were once joined together to form a single item. Level II Association: Items correspond in all tested properties and share atypical characteristic(s) that would not be expected to be readily available in the population of this evidence type. No exclusionary differences are detected. Level III Association: Items correspond in all tested properties and, therefore, could have originated from the same source. Other items have been manufactured and/or are naturally occurring that would also correspond to the submitted evidence. No exclusionary differences are detected. Level IV Association: Items correspond in tested properties and, therefore, could have originated from the same source. The items share typical characteristics expected to be readily available in the population of this evidence type. No exclusionary differences are detected. Alternatively, an association between items could be categorized as a Level IV Association if a limited analysis is performed. The extent of limited analysis varies and is specified in the report. Definitions: Physical Fit: Associated items physically fit and/or align one another by way of corresponding surface characteristics. The associated items were once joined together to form a single item. Associated: The questioned sample is the same distinct type of material as the known standard based upon detected properties. In other words, one could not discern a questioned sample if it were to be mixed with an associated known standard. No exclusionary differences are detected. Disassociated: Exclusionary differences are detected upon comparison. Inconclusive: No conclusion could be reached regarding an association or an elimination. Elimination: The sample did not originate from the source represented by the known standard. Samples are disassociated from the standard due to detecting exclusionary differences upon comparison.</p>

Test No. 24-5439: Fibers Analysis

DATA MUST BE SUBMITTED BY **March 11, 2024, 11:59 p.m. EDT** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: GJBDXX

The Accreditation Release section can be accessed by using the "Continue to Final Submission" button above. This information can be entered at any time prior to submitting to CTS.

Scenario:

Police are investigating an assault and robbery case. The victim was attacked on the street and wore a black t-shirt and jeans. The owner of a nearby store witnessed the attacker run away and alerted police, where they apprehended the suspect a few blocks away that same night. Police recovered fibers from the suspect, which were similar to the victim's t-shirt. Police are requesting you to examine the fibers, report their identification(s), and determine if the fibers found on the suspect could have come from the t-shirt worn by the victim.

Items Submitted (Sample Pack FIBR):

Item 1: Known section of fabric from the victim's t-shirt.

Item 2: Questioned fibers recovered from the suspect.

Item 3: Questioned fibers recovered from the suspect.

1.) Could either of the questioned fibers recovered from the suspect (Item 2 and Item 3) have originated from the victim's t-shirt (Item 1)?

	Yes	No	Inconclusive
Item 2:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Item 3:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2.) Fiber Type Determination.

Please enter the fiber type (Manufactured, Animal, or Vegetable) and generic name in the blank provided for each Item. For Manufactured fibers please use the terminology in the appendix provided. (Example: Item 1 Vegetable, Cotton)

Item 1:	<input type="text"/>
Item 2:	<input type="text"/>
Item 3:	<input type="text"/>

3.) Indicate the procedure(s) used to examine the submitted items:

Please check all that apply.

Microscopic Exams:	<input type="checkbox"/> Stereo	<input type="checkbox"/> Comparison
	<input type="checkbox"/> Polarized Light	<input type="checkbox"/> Fluorescence
<input type="checkbox"/> Macroscopic Exam	<input type="checkbox"/> IR/FTIR	<input type="checkbox"/> Microspectrophotometry
<input type="checkbox"/> Solubility Tests	<input type="checkbox"/> Cross-Section	<input type="checkbox"/> Melting Point

Other (specify):

Please note: Any additional formatting applied in the free form space below will not transfer to the Summary Report and may cause your information to be illegible. This includes additional spacing and returns that present your responses in lists and tabular formats.

4.) What would be the wording of the Conclusions in your report?

5.) Additional Comments

Appendix: Manufactured Fibers - Names & Definitions

Federal Trade Commission Rules and Regulations Under the Textile Fiber Products Identification Act 16 CFR Part 303

§303.7 Generic Names and Definitions for Manufactured Fibers

Pursuant to the provisions of Section 7(c) of the Act, the Commission hereby establishes the generic names for manufactured fibers, together with their respective definitions, set forth in this section, and the generic names for manufactured fibers, together with their respective definitions, set forth in International Organization for Standardization ISO 2076: 1999(E), "Textiles - Man-made fibres - Generic names."

(a) Acrylic

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of acrylonitrile units.

(b) Modacrylic

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of less than 85% but at least 35% by weight of acrylonitrile units, except fibers qualifying under paragraph (j)(2) of this section and fibers qualifying under paragraph (q) of this section.

(c) Polyester

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of a substituted aromatic carboxylic acid, including but not restricted to substituted terephthalate units, and para substituted hydroxy-benzoate units. (1) Where the fiber is formed by the interaction of two or more chemically distinct polymers (of which none exceeds 85% by weight), and contains ester groups as the dominant functional unit (at least 85% by weight of the total polymer content of the fiber), and which, if stretched at least 100%, durably and rapidly reverts substantially to its unstretched length when the tension is removed, the term elasterell-p may be used as a generic description of the fiber. (2) Where the glycol used to form the ester consists of at least ninety mole percent 1,3-propanediol, the term "trixeta" may be used as a generic description of the fiber.

(d) Rayon

A manufactured fiber composed of regenerated cellulose, as well as manufactured fibers composed of regenerated cellulose in which substituents have replaced not more than 15% of the hydrogens of the hydroxyl groups. Where the fiber is composed of cellulose precipitated from an organic solution in which no substitution of the hydroxyl groups takes place and no chemical intermediates are formed, the term lyocell may be used as a generic description of the fiber.

(e) Acetate

A manufactured fiber in which the fiber-forming substance is cellulose acetate. Where not less than 92% of the hydroxyl groups are acetylated, the term triacetate may be used as a generic description of the fiber.

(f) Saran

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 80% by weight of vinylidene chloride units.

(g) Azlon

A manufactured fiber in which the fiber-forming substance is composed of any regenerated naturally occurring proteins.

(h) Nylril

A manufactured fiber containing at least 85% of a long chain polymer of vinylidene dinitrile where the vinylidene dinitrile content is no less than every other unit in the polymer chain.

(i) Nylon

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polyamide in which less than 85% of the amide linkages are attached directly to two aromatic rings.

(j) Rubber

A manufactured fiber in which the fiber-forming substance is comprised of natural or synthetic rubber, including the following categories: (1) A manufactured fiber in which the fiber-forming substance is a hydrocarbon such as natural rubber, polyisoprene, polybutadiene, copolymers of dienes and hydrocarbons, or amorphous (noncrystalline) polyolefins. (2) A manufactured fiber in which the fiber-forming substance is a copolymer of acrylonitrile and a diene (such as butadiene) composed of not more than 50% but at least 10% by weight of acrylonitrile units. The term lastrile may be used as a generic description for fibers falling within this category. (3) A manufactured fiber in which the fiber-forming substance is a polychloroprene or a copolymer of chloroprene in which at least 35% by weight of the fiber-forming substance is composed of chloroprene units.

(k) Spandex

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polymer comprised of at least 85% of a segmented polyurethane.

(l) Vinal

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50% by weight of vinyl alcohol units, and in which the total of the vinyl alcohol units and any one or more of the various acetal units is at least 85% by weight of the fiber.

(m) Olefin

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of ethylene, propylene, or other olefin units, except amorphous (noncrystalline) polyolefins qualifying under paragraph (j)(1) of this section. Where the fiber-forming substance is a cross-linked synthetic polymer, with low but significant crystallinity, composed of at least 95% by weight of ethylene and at least one other olefin unit, and the fiber is substantially elastic and heat resistant, the term lastol may be used as a generic description of the fiber.

(n) Vinyon

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of vinyl chloride units.

(o) Metallic

A manufactured fiber composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal.

(p) Glass

A manufactured fiber in which the fiber-forming substance is glass.

(q) Anidex

A manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50% by weight of one or more esters of a monohydric alcohol and acrylic acid.

(r) Novoloid

A manufactured fiber containing at least 85% by weight of a cross-linked novolac.

(s) Aramid

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polyamide in which at least 85% of the amide linkages are attached directly to two aromatic rings.

(t) Sulfar

A manufactured fiber in which the fiber-forming substance is a long chain synthetic polysulfide in which at least 85% of the sulfide linkages are attached directly to two (2) aromatic rings.

(u) PBI

A manufactured fiber in which the fiber-forming substance is a long chain aromatic polymer having reoccurring imidazole groups as an integral part of the polymer chain.

(v) Elastoeater

A manufactured fiber in which the fiber-forming substance is a long-chain synthetic polymer composed of at least 50% by weight of aliphatic polyether and at least 35% by weight of polyester, as defined in 16 CFR 303.7(c).

(w) Melamine

A manufactured fiber in which the fiber-forming substance is a synthetic polymer composed of at least 50% by weight of a cross-linked melamine polymer.

(x) Fluoropolymer

A manufactured fiber containing at least 95% of a long-chain polymer synthesized from aliphatic fluorocarbonmonomers.

(y) PLA

A manufactured fiber in which the fiber-forming substance is composed of at least 85% by weight of lactic acid ester units derived from naturally occurring sugars.

RELEASE OF DATA TO ACCREDITATION BODIES

The Accreditation Release is accessed by pressing the "Continue to Final Submission" button online and can be completed at any time prior to submission to CTS.

CTS submits external proficiency test data directly to ANAB and/or A2LA. Please select one of the following statements to ensure your data is handled appropriately.

- This participant's data is intended for submission to ANAB and/or A2LA. (Accreditation Release section below must be completed.)
- This participant's data is not intended for submission to ANAB and/or A2LA.

Have the laboratory's designated individual complete the following steps **only if your laboratory is accredited in this testing/calibration discipline** by one or more of the following Accreditation Bodies.

Step 1: Provide the applicable Accreditation Certificate Number(s) for your laboratory.

ANAB Certificate No.

A2LA Certificate No.

Step 2: Complete the Laboratory Identifying Information in its entirety.

Authorized Contact Person and Title

Laboratory Name

Location (City/State)