



Fibers Analysis Test No. 26-5439

Summary Report

Each participant received a sample pack consisting of known fabric and questioned fiber samples which they were asked to examine using their existing protocols. Data were returned from 83 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 pack consisted of known fabric and questioned fiber samples. 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: Each fabric used was laid out separately and any extraneous debris removed with a lint roller, and then cut into 2" x 2" square swatches. Elimination item(s) were prepared separately from other items to prevent contamination.

KNOWN ITEMS: One section of known fabric, approximately 2" x 2" in size, was selected and deposited into a glassine bag and then placed into a pre-labeled item envelope and sealed.

QUESTIONED ITEMS: A predetermined number of warp and weft fibers were teased from the edges of the fabric swatches, deposited into a glassine bag and then placed into a pre-labeled item envelope and sealed.

SAMPLE PACK ASSEMBLY: All items were placed into a pre-labeled sample pack and sealed. This process was repeated until all of the sample packs were prepared.

VERIFICATION: Predistribution results were consistent with each other and the manufacturer's preparation information. The predistribution laboratories identified the fiber(s) as Manufactured Polyester or Vegetable Cotton and the following procedures were used to examine the items: Stereomicroscopy, Polarized Light Microscopy, Comparison Microscopy, Fluorescence, Macroscopic Examination, Microspectrophotometry, and IR/FTIR.

Item	Known/ Questioned	Association/ Elimination	Generic Name	Color
1	Known	--	Polyester	Hot Pink
2	Questioned	Association	Polyester	Hot Pink
3	Questioned	Elimination	Cotton	Hot Pink

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 fiber samples (Items 2 and 3). Items 1 and 2 originated from the same fabric. Item 3 originated from a different fabric than that of Items 1 and 2. Refer to the Manufacturer's Information for preparation details.

ASSOCIATION RESULTS: Of the 83 responding participants in Table 1: Association Results, 82 (99%) associated Item 2 and eliminated Item 3 as having originated from the Item 1 known fabric. The remaining participant did not provide a response in Table 1 per their laboratory's policy.

FIBER TYPE DETERMINATION: Of the 83 responding participants in Table 2: Fiber Type Determination, 81 (98%) reported Manufactured, Polyester for Items 1 and 2 and 76 (92%) reported Vegetable, Cotton for Item 3. 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.

EXAMINATION PROCEDURES: The most commonly reported examination procedures included: Stereomicroscopy (98%), IR/FTIR (93%), Polarized Light (88%), Comparison Microscopy (72%), and Macroscopic Examination (70%).

Association Results

Could either of the questioned fibers recovered from the suspect's belt buckle (Item 2) or the suspect's purse (Item 3) have originated from the victim's torn dress (Item 1)?

TABLE 1

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
297LM4	Yes	No	6BE9NX	Yes	No
2H8AE2	Yes	No	6VPZRZ		
2HTM3D	Yes	No	87KTDW	Yes	No
2J3RF3	Yes	No	8EQUB3	Yes	No
2MMJR6	Yes	No	8YYXA8	Yes	No
32E2U9	Yes	No	92K489	Yes	No
38QPU6	Yes	No	97VEY3	Yes	No
3J43V6	Yes	No	9KWN7X	Yes	No
3ND6X2	Yes	No	9P4GX9	Yes	No
3T6AR6	Yes	No	AB28UY	Yes	No
3TAUE9	Yes	No	AFBLBX	Yes	No
3YB7B6	Yes	No	B9TCM2	Yes	No
3Z696U	Yes	No	BXCR46	Yes	No
4CV6EC	Yes	No	BY8B67	Yes	No
4JDD39	Yes	No	CK2HDT	Yes	No
4XYQG4	Yes	No	CPCR43	Yes	No
4YU9H6	Yes	No	CZXWB2	Yes	No

TABLE 1- Association Results

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
DHRRNP	Yes	No	LE467N	Yes	No
DPRCNZ	Yes	No	LY8Q9F	Yes	No
E2YGER	Yes	No	M6T3KM	Yes	No
EGRBNX	Yes	No	MD3RYL	Yes	No
EGWCZ	Yes	No	MRNZ7K	Yes	No
F9WQXP	Yes	No	NN2RBP	Yes	No
FG8RJQ	Yes	No	P4CTKL	Yes	No
FL2P7W	Yes	No	QJJ7FN	Yes	No
FLKU42	Yes	No	R3TLC9	Yes	No
FT323T	Yes	No	RANQ4P	Yes	No
GG6JQX	Yes	No	RMG8UB	Yes	No
GKPC2Z	Yes	No	T4KWVE	Yes	No
HNHVHN	Yes	No	TAMDVM	Yes	No
HUNNDK	Yes	No	TN49BJ	Yes	No
JLAZCQ	Yes	No	TW2ZJD	Yes	No
K2HD8T	Yes	No	TYKTVF	Yes	No
KCH2YQ	Yes	No	UC9EEF	Yes	No
KDEJZR	Yes	No	UF8RYK	Yes	No
KL467P	Yes	No			

TABLE 1- Association Results

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
UKYZJD	Yes	No			
UXQLP9	Yes	No			
UZBD2C	Yes	No			
VECAJ	Yes	No			
VNFJ69	Yes	No			
W6FTLJ	Yes	No			
WC3J9E	Yes	No			
WME7W7	Yes	No			
XUDTN7	Yes	No			
XVA9XH	Yes	No			
YEJQK8	Yes	No			
ZQTM3F	Yes	No			

Association Response Summary			Participants: 83
<p>Could either of the questioned fibers recovered from the suspect's belt buckle (Item 2) or the suspect's purse (Item 3) have originated from the victim's torn dress (Item 1)?</p>			
	<u>Item 2</u>	<u>Item 3</u>	
Yes:	82 (98.8%)	0 (0.0%)	
No:	0 (0.0%)	82 (98.8%)	
Inc:	0 (0.0%)	0 (0.0%)	
<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
297LM4	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
2H8AE2	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton and flax
2HTM3D	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
2J3RF3	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
2MMJR6	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
32E2U9	Manufactured - Polyester	Manufactured - Polyester	Vegetable - Cotton
38QPU6	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
3J43V6	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
3ND6X2	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
3T6AR6	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
3TAUE9	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
3YB7B6	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
3Z696U	1. Polyester; 2. Polyester (Synthetic)	1. Polyester; 2. Polyester (Synthetic)	Cotton (Vegetable)
4CV6EC	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
4JDD39	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
4XYQG4	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
4YU9H6	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
6BE9NX	Manufactured; Polyester	Manufactured; Polyester	Vegetable; not further characterized
6VPZRZ	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
87KTDW	Manufactured	Manufactured	Vegetable - Cotton
8EQUB3	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
8YYXA8	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
92K489	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
97VEY3	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton

TABLE 2- Fiber Type Determination

WebCode	Item 1	Item 2	Item 3
9KWN7X	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
9P4GX9	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
AB28UY	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
AFBLBX	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
B9TCM2	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
BXCR46	Manufactured - Polyester, Manufactured - Polyester	Manufactured - Polyester, Manufactured - Polyester	Vegetable - Cotton
BY8B67	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
CK2HDT	Manufactured, Polyester (Polyethylene terephthalate - PET)	Manufactured, Polyester (Polyethylene terephthalate - PET)	Vegetable, Cotton
CPCR43	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
CZXWB2	Manufactured, Polyester (PET)	Manufactured, Polyester (PET)	Vegetable, Cotton
DHRRNP	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
DPRCNZ	Manufactured - Polyester	Manufactured - Polyester	Vegetable - Cotton
E2YGER	Manufactured - Polyester/Olefin	Manufactured - Polyester/Olefin	Manufactured - Rayon (cellulose)
EGRBNX	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
EGVWCZ	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
F9WQXP	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
FG8RJQ	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
FL2P7W	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
FLKU42	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
FT323T	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
GG6JQX	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
GKPC2Z	Nylon	Nylon	vegetal Cotton
HNHVHN	Polyester	Polyester	Cotton
HUNNDK	1. Pinkish Manufactured, Polyester (PET) fibers, delustered/ profiled; 2. Light pinkish manufacture	1. Pinkish Manufactured, Polyester (PET) fibers, delustered/ profiled; 2. Light pinkish manufacture	Pinkish unevenly colored Vegetable, Cotton fibers

TABLE 2- Fiber Type Determination

WebCode	Item 1	Item 2	Item 3
JLAZCQ	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
K2HD8T	Manufactured - Polyester	Manufactured - Polyester	Vegetable - Cotton
KCH2YQ	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
KDEJZR	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
KL467P	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
LE467N	Polyester	Polyester	Cotton
LY8Q9F	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
M6T3KM	Manufactured Polyester	Manufactured Polyester	Vegetable Cotton
MD3RYL	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
MRNZ7K	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
NN2RBP	Manufactured, Polyester	Manufactured, Polyester	Not identified
P4CTKL	Manufactured, Polyester/ Manufactured, Polyester	Manufactured, Polyester/ Manufactured, Polyester	Vegetable, Cotton
QJJ7FN	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
R3TLC9	Manufactured, Polyester	Manufactured, Polyester	Manufactured (semi-synthetic bamboo fiber), Rayon
RANQ4P	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
RMG8UB	Manufactured; Polyester	Manufactured; Polyester	Vegetable; Cotton
T4KWVE	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
TAMDVM	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
TN49BJ	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
TW2ZJD	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
TYKTVF	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
UC9EEF	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
UF8RYK	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
UKYZJD	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
UXQLP9	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Not further identified

TABLE 2- Fiber Type Determination

WebCode	Item 1	Item 2	Item 3
UZBD2C	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
VECAXJ	Manufactured, Polyester	Manufactured, Polyester	
VNFJ69	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
W6FTLJ	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
WC3J9E	Manufactured, polyester	Manufactured, polyester	Vegetable, Cotton
WME7W7	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
XUDTN7	Manufactured, Polyester	Manufactured, Polyester	Vegetable, not further catagorized
XVA9XH	Two distinct fibre types in item 1. Both Manufactured, Polyester	Two distinct fibre types in item 2. Both Manufactured, Polyester	Vegetable, Cotton
YEJQK8	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton
ZQTM3F	Manufactured, Polyester	Manufactured, Polyester	Vegetable, Cotton

Fiber Type Determination Response Summary			Participants: 83
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>	
Polyester: 81 (97.6%)	Polyester: 81 (97.6%)	Cotton: 76 (91.6%)	
*Other: 2 (2.4%)	*Other: 2 (2.4%)	*Other: 6 (7.2%)	
*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
297LM4	✓	✓	✓	✓	✓	✓	✓				Visible and UV MSP
2H8AE2	✓				✓	✓	✓				
2HTM3D	✓	✓	✓	✓		✓					
2J3RF3	✓	✓	✓	✓		✓	✓	✓			-
2MMJR6	✓	✓	✓	✓	✓	✓	✓				
32E2U9	✓	✓	✓		✓	✓	✓	✓			
38QPU6	✓				✓	✓		✓			PyGC-MS, SEM/EDS
3J43V6	✓	✓	✓	✓	✓	✓	✓				
3ND6X2	✓		✓	✓		✓					GCMS Pyrolysis
3T6AR6	✓	✓	✓		✓		✓		✓		
3TAUE9	✓	✓	✓	✓	✓	✓	✓				
3YB7B6	✓	✓	✓	✓	✓	✓	✓	✓			
3Z696U	✓	✓			✓	✓					
4CV6EC	✓	✓	✓	✓		✓	✓				Birefringence
4JDD39	✓	✓	✓		✓	✓					UV light source
4XYQG4	✓	✓	✓	✓	✓	✓	✓				microchemical analysis
4YU9H6	✓		✓			✓	✓				
6BE9NX	✓	✓	✓	✓		✓	✓				

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
6VPZRZ	✓	✓		✓	✓						
87KTDW	✓										
8EQUB3	✓	✓			✓	✓					
8YYXA8	✓	✓	✓	✓	✓	✓	✓	✓			
92K489	✓	✓	✓	✓			✓				
97VEY3	✓		✓	✓	✓	✓		✓			
9KWN7X	✓		✓		✓	✓					
9P4GX9	✓	✓	✓	✓	✓		✓	✓			
AB28UY	✓	✓	✓		✓	✓					
AFBLBX	✓	✓	✓	✓	✓	✓	✓				
B9TCM2	✓			✓	✓	✓					
BXCR46	✓	✓	✓	✓	✓	✓	✓				Optical sectioning
BY8B67	✓	✓	✓		✓	✓					
CK2HDT	✓	✓	✓	✓	✓	✓	✓				
CPCR43	✓	✓	✓	✓	✓	✓	✓	✓			TLC
CZXWB2	✓	✓	✓	✓	✓	✓	✓				HPLC
DHRRNP	✓	✓	✓	✓	✓	✓	✓				
DPRCNZ	✓	✓	✓		✓	✓					
E2YGER						✓					SEM/EDS

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
EGRBNX	✓	✓	✓	✓	✓	✓					Raman
EGWCZ	✓	✓	✓	✓	✓	✓		✓	✓		Raman, Pyrolysis GC-MS
F9WQXP		✓		✓	✓	✓	✓				
FG8RJQ	✓	✓	✓	✓	✓	✓					
FL2P7W	✓	✓	✓	✓	✓	✓		✓			
FLKU42	✓	✓	✓	✓	✓	✓					
FT323T	✓	✓	✓		✓	✓					
GG6JQX	✓	✓	✓	✓	✓	✓					
GKPC2Z	✓	✓	✓		✓			✓			
HNHVHN	✓			✓	✓	✓					PYROLYSIS -GC/MS
HUNNDK	✓	✓	✓	✓		✓		✓			
JLAZCQ	✓	✓	✓		✓	✓	✓				ALS
K2HD8T	✓	✓	✓	✓	✓	✓	✓				
KCH2YQ	✓	✓	✓	✓	✓	✓	✓		✓		
KDEJZR	✓	✓	✓			✓					
KL467P	✓		✓	✓		✓	✓				
LE467N	✓	✓	✓	✓	✓		✓				Pyrolysis, GC/MS
LY8Q9F	✓					✓					Py/GC-MS and SEM/EDS
M6T3KM	✓		✓		✓	✓					SEM/EDS

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
MD3RYL	✓	✓		✓	✓	✓					SEM
MRNZ7K	✓		✓		✓	✓		✓			TLC
NN2RBP	✓	✓	✓	✓	✓	✓	✓	✓			
P4CTKL	✓	✓	✓	✓	✓	✓	✓	✓			
QJJ7FN	✓	✓	✓	✓		✓	✓				Raman
R3TLC9	✓	✓	✓		✓	✓					
RANQ4P	✓	✓	✓	✓	✓	✓	✓				TLC
RMG8UB	✓	✓	✓	✓		✓	✓				optical cross-section
T4KWVE	✓	✓	✓	✓	✓	✓	✓				Measurement of crimping
TAMDVM	✓		✓	✓	✓	✓	✓	✓			
TN49BJ	✓	✓	✓	✓		✓	✓				
TW2ZJD	✓	✓	✓	✓		✓	✓				
TYKTVF	✓		✓		✓	✓			✓		Py-GC-FID
UC9EEF	✓		✓			✓		✓			Raman
UF8RYK	✓	✓	✓		✓	✓					
UKYZJD	✓	✓	✓	✓		✓	✓	✓			
UXQLP9	✓	✓	✓	✓	✓	✓	✓				
UZBD2C	✓		✓			✓					
VECAJ	✓	✓	✓	✓	✓	✓	✓	✓			

TABLE 3- Examination Methods

WebCode	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	Other
VNFJ69	✓	✓			✓	✓					Scanning Electron Microscopy (SEM)
W6FTLJ	✓	✓	✓	✓	✓	✓	✓				
WC3J9E	✓	✓	✓	✓	✓	✓	✓		✓		
WME7W7	✓		✓			✓			✓		
XUDTN7	✓	✓	✓	✓	✓	✓	✓		✓		
XVA9XH	✓	✓	✓	✓	✓	✓	✓				
YEJQK8	✓		✓		✓	✓	✓				Pyrolysis-GC/MS
ZQTM3F	✓	✓	✓	✓	✓	✓	✓				longitudinal cross section

Examination Methods Response Summary											Participants: 83
	Stereomicroscope	Comparison	Polarized Light	Fluorescence	Macroscopic Exam	IR/FTIR	Microspectrophotometry	Solubility Tests	Cross-Section	Melting Point	
Participants	81	60	73	52	58	77	54	4	22	3	
Percent	98%	72%	88%	63%	70%	93%	65%	5%	27%	4%	

Conclusions

TABLE 4

WebCode	Conclusions
297LM4	<p>Item 1. Known section of fabric from victim's torn dress This item consisted of a piece of pink fabric which was approximately five centimetres square. The fabric was made of threads of one type of pink polyester fibres woven with threads made of another type of pink polyester fibres. Item 2. Questioned fibres recovered from suspect's belt buckle This item consisted of a small number of pink threads. Some of the threads were made of one type of pink polyester fibres and other threads were made of another type of pink polyester fibres. The threads were similar in nature and colour to those comprising the dress sample (Item 1). In my opinion, the two types of polyester fibres comprising the different threads in Item 2 were found to be indistinguishable by microscopy and instrumental colour analysis from the two types of fibres comprising the sample (Item 1) from the dress. As such Item 2 could have come from Item 1. I understand that the victim was found with a torn dress. I understand that a suspect was apprehended and the threads (Item 2) were recovered from her belt buckle. I have assumed that there was a piece missing from the dress which was in keeping with the size and nature of Item 2. When evaluating these findings, I have considered the following propositions: - The sample (Item 2) recovered from the suspect's belt buckle originated from the dress (Item 1). - The sample (Item 2) recovered from the suspect's belt buckle did not originate from the dress (Item 1). In my opinion, the findings are much more likely if the first proposition was true rather than the second proposition. The evaluation of the evidence in this case has been expressed qualitatively and follows the verbal scale suggested by the Statutory Forensic Science Regulator (no more likely, slightly more likely, more likely, much more likely and very much more likely). Item 3. Questioned fibres recovered from the suspect's purse This item consisted of a small number of pink threads. The threads were made of cotton fibres which changed colour along their length from pink to colourless and as such, in my opinion, did not originate from the sampled area of the dress (Item 1).</p>
2H8AE2	<p>Item 1 and Item 2 fibers have the same colour, disposition and composition, so they may have a common origin. Item 1 and 3 have fibers has different tones, disposition an composition, so the don't have the same origin.</p>
2HTM3D	<p>Item 2 - The collected fibers were compared to the known fibers in item 1. Item 1 and 2 are indistiguishable in regards to their physical, microscopic, and chemical properties. The fibers in item 2 could have originated from item 1 or from a source of manufactured fibers with the same properties. Item 3 - The collected fibers were compared to the known fibers in item 1. Item 1 and 3 are not similar in any measured properties. Item 1 is not a source of the fibers in item 3.</p>
2J3RF3	<p>The results strongly support that the fibers recovered from the suspect's belt buckle (Item 2) come from the victim's torn dress (Item 1). The fibers recovered from the suspect's purse (Item 3) do not come from the victim's torn dress (Item 1).</p>
2MMJR6	<p>The comparison between the unknown fibers from Item 2 and the exemplar fabric from Item 1 revealed similar class characteristics (fiber type, color and manufacturing characteristics), therefore, the source of the exemplar fabric in Item 1 is included as a possible source of the unknown fibers in Item 2. The comparison between the unknown fibers from Item 3 and the exemplar fabric from Item 1 revealed dissimilar class characteristics (fiber type and manufacturing characteristics), therefore, the source of the exemplar fabric in Item 1 is excluded as a possible source of the unknown fibers in Item 3.</p>
32E2U9	<p>Based on the analyses conducted, no exclusionary differences in microscopic properties, color (determined by MSP), chemical composition (determined by FTIR), or cross-sectional shape were found to exist between the fully analyzed polyester fibers from 1.2.1 and 1.2.2 and the analyzed polyester fibers from items 1.1.1 and 1.1.2, respectively. The tested fibers from items 1.2.1 and 1.2.2 could have originated from the same source as represented by the known fabric section (item 1.1) or from another textile source with fibers exhibiting all of the same analyzed characteristics. Exclusionary differences were found between the cotton fibers from item 1.3 and the analyzed polyester fibers from items 1.1.1 and 1.1.2 with respect to their color, luster, texture, and composition. Based on these differences, the fibers from item 1.3 could not have originated from the source represented by item 1.1.</p>

TABLE 4

WebCode	Conclusions
38QPU6	1. According to the results of microscopic examination, cross-section, FT-IR, PyGC-MS 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.
3J43V6	Item 1 (control fabric) comprised a square section of woven pink fabric, approximately 5 cm by 5 cm. The warp yarn was composed of pink non-delustered trilobal polyester fibres. The weft yarn was composed of pink delustered polyester fibres. Item 2 (questioned fibres recovered from the suspect's belt) comprised 4 pink yarns. Two yarns were composed of pink non-delustered trilobal polyester fibres. These fibres corresponded in appearance and composition to the warp yarn of the control fabric (Item 1). The remaining two yarns were composed of pink delustered polyester fibres. These fibres corresponded in appearance and composition to the weft yarn of the control fabric (Item 1). Item 3 (questioned fibres recovered from the suspect's purse) comprised 4 pink yarns. All 4 yarns were composed solely of red/colourless cotton fibres and could not have originated from the fabric represented by control Item 1.
3ND6X2	Item 2 could have originated from Item 1 Item 3 could not have originated from Item 1
3T6AR6	The sample received as the "Known section of fabric from the victim's torn dress" (Item 1) is made by pink polyester fibers. 2. The sample received as the "Questioned fibers recovered from the suspect's belt buckle" (Item 2) is made by pink polyester fibers. 3. The sample received as the "Questioned fibers recovered from the suspect's purse" (Item 3) is made by pink 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. However, due to the manufacturing dynamics of garments of this type, it is likely that there are others that may be related to the one in question or the one provided as a comparison standard, but these must, necessarily, be made of the same type of fibers, have been subjected to the same manufacturing processes, and also present the same physical, macroscopic and microscopic properties evaluated.
3TAUE9	The fibers of the suspect's belt buckle (Item 2) could have originated from the victim's dress (Item 1).
3YB7B6	The delustered and non-delustered red/pink fibers observed in item 1-2 are microscopically similar to the delustered and non-delustered red/pink fibers which compose the swatch in item 1-1; therefore, these fibers could have originated from the fabric where the standard from item 1-1 was retrieved. The red/pink and colorless cotton fibers recovered from 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.
3Z696U	Questioned fiber's fragments recovered from the the suspect's belt buckle (item 2) and the victim's torn dress (item 1) fibers have the common characteristically features.
4CV6EC	The known section of the torn dress (Item 1) is composed of woven hot pink polyester fibers and pink polyester fibers. The questioned fibers recovered from the belt buckle (Item 2) are composed of hot pink polyester fibers and pink polyester fibers. The questioned fibers recovered from the purse (Item 3) are pink cotton fibers. The hot pink polyester fibers recovered from the belt buckle (Item 2) are similar in physical appearance, measured color, diameter, fluorescence, chemistry, birefringence and visual cross-sectional shape in comparison to the hot pink polyester fibers from the known section of the torn dress (Item 1). The hot pink polyester fibers recovered from the belt buckle (Item 2) could have come from the same source of fibers as the fabric from the torn dress (Item 1) or any other item containing hot pink polyester fibers with similar characteristics as the hot pink polyester fibers in Item 1. The pink polyester fibers recovered from the belt buckle (Item 2) are similar in physical appearance, measured color, diameter, fluorescence, chemistry, birefringence and visual cross-sectional shape in comparison to the pink polyester fibers from the known section of the torn dress (Item 1). The pink polyester fibers recovered from the belt buckle (Item 2) could have come from the same source of fibers as the fabric from the torn dress (Item 1) or any other item containing pink polyester fibers with similar characteristics as the pink polyester fibers in Item 1. The pink cotton fibers recovered from the purse (Item 3) are different in comparison to the known section of the torn dress (Item 1) which is constructed of polyester fibers. The pink cotton fibers recovered from the purse (Item 3) could not have originated from the same source of fibers as the fabric section of the torn dress (Item 1). Items were examined visually and using stereomicroscopy, Fourier Transform Infrared Spectroscopy, Polarized Light Microscopy, Fluorescence,

TABLE 4

WebCode	Conclusions
	Birefringence and Microspectrophotometry. Samples collected and analyzed during the examination and analysis of the items in this case (ex. glass slides) have been returned to and retained with the original item.
4JDD39	Items 1-3 were sampled and examined stereoscopically using an ultra-violet (UV) light source, microscopically and instrumentally using Fourier Transform Infrared Spectrometry. Items 1 (known fabric from victim's dress) and 2 (questioned fibers from suspect's belt buckle) were consistent with respect to color, diameter, textures present, and chemical composition (synthetic polyester type fibers). This indicates that 1 and 2 could share a common source of origin. -Questioned item 2 could also have originated from additional sources that are indistinguishable in all assessed examinations and analyses. -No statistical or numerical probabilities can be applied to the conclusions of this report. Items 1 and 3 were not consistent due to color/dye properties and chemical composition.
4XYQG4	1. The questioned fibers recovered from the suspect's belt buckle (Item2) could have originated from the victim's torn dress (Item1). 2. The questioned fibers recovered from the suspect's purse (Item3) could not have originated from the victim's torn dress (Item1).
4YU9H6	Based on the comparison of appearance, chemical composition, and color, Item 2 is considered to have originated from Item 1. On the other hand, Item 3 is not considered to have originated from Item 1.
6BE9NX	The Item 2 pink polyester fibers exhibit the microscopic characteristics and optical properties as the pink polyester fibers comprising Item 1. Accordingly, Item 2 is consistent with originating from Item 1, or another source comprised of fibers with the same microscopic characteristics and optical properties. Item 3 is microscopically dissimilar to the fibers comprising Item 1. Accordingly, Item 3 is 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.
6VPZRZ	Item 1, fabric from the victim's torn dress, contains manufactured fibers, identified as polyester. Item 2, fibers recovered from suspect's belt buckle, contains manufactured fibers, identified as polyester. Item 3, fibers recovered from the suspect's purse, contains vegetable fibers, identified as cotton.
87KTDW	Fibres recovered from item 2 are in my opinion, visually similar to component fibres of the deceased's dress (item 1), using low power microscopy. Fibres from item 3 are in my opinion, visually dissimilar from component fibres of the deceased's dress (item 1), in that they can be excluded as having originated from it, using low power microscopy. Further high power microscopy and analytical tests are required to determine if the fibres from the belt buckle (item 2) could have originated from the dress (item 1).
8EQUB3	FTIR and microspectrophotometry(MSP) analyses indicate that the fibers from Item 1 and Item 2 are both composed of polyester and exhibit similar pink coloration. Therefore, Item 2 could have originated from the same source as Item 1. Fibers from Item 3, however, were identified as pink cotton, which differs in composition and color characteristics from Item 1. Based on these results, Item 3 is considered unlikely to have originated from the same source as Item 1.
8YYXA8	The selected fibers from items 1 and 2 are pink polyester fibers. The selected fibers from item 3 are pink and white cotton fibers. Item 2, fibers A and B are similar in microscopic characteristics to item 1, fiber B. Additionally, they have similar cross sections and MSP and FTIR spectra. Therefore, the item 2, fibers A and B could have originated from item 1 or any other textile containing fibers with the same class characteristics. Item 2, fibers C and D are similar in microscopic characteristics to item 1, fiber A. Additionally, they have similar cross sections and MSP and FTIR spectra. Therefore, the item 2, fibers C and D could have originated from item 1 or any other textile containing fibers with the same class characteristics. The item 3, fibers A - D are dissimilar in microscopic characteristics and are a different fiber type than the selected fibers of item 1. Therefore, item 3 could not have originated from item 1.
92K489	1. Exhibit 1 (known section of fabric from the victim's torn dress) consists of a section of fabric composed of delustered and non-delustered, pink, polyester fibers. 2. Comparative examinations of the delustered and non-delustered, pink, polyester fibers from Exhibit 1 with the delustered and non-delustered, pink,

TABLE 4

WebCode	Conclusions
	<p>polyester fibers from Exhibit 2 (questioned fibers recovered from the suspect's belt buckle) 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 examinations of the delustered and non-delustered, pink, polyester fibers from Exhibit 1 with the pink, cotton fibers from Exhibit 3 (questioned fibers recovered from the suspect's purse) 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. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type.</p>
97VEY3	<p>The questioned fibers, recovered from the suspect's belt buckle (item 2) match in all examined criteria the fibers from the victim's dress (item 1). Therefore it is likely that the recovered fibers are derived from the dress, worn by the victim during the incident, or a textile of the same kind. There is no evidence that the questioned fibers, recovered from the suspect's purse, originated from the victim's dress.</p>
9KWN7X	<p>Fibers from Item 1 were identified polyester. Item 2 and 3 were identified as polyester and cotton, respectively. Item 2 were similar microscopic characteristics and chemical compositions with Item 1, measured by FT-IR and Polarized light microspectroscopy (PLM). Therefore, the questioned fibers recovered from the suspect's belt buckle (Item 2) have originated from Item 1, the known section of fabric from the victim's torn dress.</p>
9P4GX9	<p>1. Examination of Exhibit 1 (item 1) disclosed the presence of two types of polyester fibers. Examination of Exhibit 2 (item 2) disclosed the presence of two types of polyester fibers. Examination of Exhibit 3 (item 3) 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. 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. 4. The following contextual statements apply to the capabilities of this analytical testing: a. The presence of transfers by multiple different fiber types strengthens the result relative to transfers by a single fiber type. b. A fiber association is not a means of positive identification and the number of possible sources for a specific fiber is unknown. c. Due to the variability in manufacturing, dyeing, and consumer use, one would not expect to encounter a suitable fiber selected at random to the consistent with a particular source.</p>
AB28UY	<p>The known fibers collected from the victim's torn dress (Item #1) are similar in physical, optical, and chemical properties to the fibers recovered from the suspect's belt buckle (Item #2). The fibers from the victim's dress (Item #1) or another material with similar fiber characteristics could have been the source of the fibers recovered from the suspect's belt buckle (Item #2). The known fibers collected from the victim's torn dress (Item #1) were excluded as a possible source to the fibers recovered from the suspect's purse (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.</p>
AFBLBX	<p>The pink polyester fibers labeled "recovered from the suspect's belt buckle, (item 2), are consistent in physical characteristics, microscopic characteristics, color, and chemical composition as compared to the pink polyester fibers from the section of pink fabric labeled "from the victim's torn dress", (item 1). Level III Association. The pink cotton fibers labeled "recovered from the suspect's purse, (item 3), are not consistent in physical characteristics and microscopic characteristics as compared to the pink polyester fibers from the section of pink fabric labeled "from the victim's torn dress", (item 1). Elimination.</p>
B9TCM2	<p>On examination, I found: i. The questioned fibers recovered from the suspect's belt buckle (Item 2) to be similar to the known section of fabric from the victim's torn dress (Item 1). ii. The questioned fibers recovered from the suspect's purse (Item 3) to be dissimilar to the known section of fabric from the victim's torn dress (Item 1). Therefore, I am of the opinion that: i. The questioned fibers recovered from</p>

TABLE 4

WebCode	Conclusions
	the suspect's belt buckle (Item 2) could have originated from the known section of of fabric from the victim's torn dress (Item 1). ii. The questioned fibers recovered from the suspect's purse (Item 3) did not originate from the known section of fabric from the victim's torn dress (Item 1).
BXCR46	<p>The questioned yarns recovered from the suspect's belt buckle (Item 2) and purse (Item 3) were examined and compared to a known section of fabric from the victim's dress (Item 1) to determine if they could have originated from that source. 1 – Known section of magenta fabric from victim's torn dress Item 1 was opened and found to contain one (1) section of magenta, woven fabric. Examination of the fibers comprising the magenta fabric revealed two different population of fibers: Population A (pop. A) – Smaller diameter with delustrant. Population B (pop. B) – Larger diameter without delustrant Yarns and fibers were collected from the section of fabric to be used for comparison purposes. 2 – Questioned magenta yarns recovered from the suspect's belt buckle Examination of Item 2 revealed the presence of four (4) magenta yarns. These yarns were examined and compared to the magenta yarns comprising the section of magenta fabric in Item 1 and were found to be consistent in color, construction, size, and appearance. Examination of the fibers comprising the magenta yarns revealed two different population of fibers: Population A (pop. A) – Smaller diameter with delustrant. Population B (pop. B) – Larger diameter without delustrant Macroscopic and microscopic examinations and comparisons of approximately eighty seven (87) magenta polyester fibers (pop. A) comprising the magenta yarns revealed that they are consistent in color, appearance, fiber type and microscopic characteristics with the magenta polyester fibers comprising the magenta fabric (Item 1). Further instrumental examinations and comparisons of thirty (30) of the magenta polyester fibers (pop. A) revealed that they are consistent with the magenta polyester fibers comprising the magenta fabric. Therefore, atleast thirty (30) magenta polyester fibers (pop. A) recovered from the suspect's belt buckle could have originated from the section of fabric from the victim's dress. Macroscopic and microscopic examinations and comparisons of approximately sixty three (63) magenta polyester fibers (pop. B) comprising the magenta yarns revealed that they are consistent in color, appearance, fiber type and microscopic characteristics with the magenta polyester fibers comprising the magenta fabric (Item 1). Further instrumental examinations and comparisons of thirty (30) of the magenta polyester fibers (pop. B) revealed that they are consistent with the magenta polyester fibers comprising the magenta fabric. Therefore, atleast thirty (30) magenta polyester fibers (pop. B) recovered from the suspect's belt buckle could have originated from the section of fabric from the victim's dress. 3 – Questioned magenta yarns recovered from the suspect's purse Examination of Item 3 revealed the presence of four (4) magenta yarns. These magenta yarns were microscopically examined and compared to the magenta yarns comprising the section of magenta fabric in Item 1 and were found to be different in construction and appearance. Therefore, these magenta yarns recovered from the suspect's purse could not have originated from the section of fabric from the victim's dress.</p>
BY8B67	<p>Item 1 consists of a cutting of woven hot pink fabric composed of polyester fibers. Item 2 consists of three hot pink threads composed of polyester fibers and a clump of hot pink polyester fibers. Item 3 consists of four pink threads composed of cotton fibers. The polyester fibers from Item 1 (Known from Victim's Dress) and Item 2 (Questioned from Suspect's Belt Buckle) are similar in macroscopic appearance, microscopic characteristics (PLM), color (MSP), and chemical composition (FTIR). The victim's dress or another item composed of the same fabric could be the source of the threads removed from the suspect's belt buckle. The polyester fibers from Item 1 and the cotton fibers from Item 3 are dissimilar in macroscopic appearance and microscopic characteristics (PLM). The victim's polyester dress is not the source of the cotton threads removed from the suspect's purse.</p>
CK2HDT	<p>In my opinion, the findings provide very strong support for the view that the yarns (fibres) recovered from the suspect's belt buckle (Item 2), originated from the victim's torn dress (Item 1), rather than from another item(s) made from identical fibres. The yarns (fibres) recovered from the suspect's purse (Item 3) could not have originated from the victim's torn dress (Item 1).</p>
CPCR43	<p>Item 1: This item was used for comparison purposes. Item 2: The questioned fibers are similar in visual color and physical properties to the known fibers from the victim's torn dress (Item 1). A portion of these fibers were selected for further analysis and are similar in optical properties, including fluorescence, color, dye composition, and fiber type to the known fibers from the victim's torn dress. It is my opinion</p>

TABLE 4

WebCode	Conclusions
	that the questioned fibers could have come from the victim 's torn dress or any other garment with similar fiber characteristics (Category 2B). No analysis was performed on the remaining fibers. Item 3: The questioned fibers are different in visual color and physical properties from the known fibers from the victim's torn dress (Item 1). It is my opinion that the questioned fibers did not come from the victim 's torn dress (Category 5). No further analysis was performed.
CZXWB2	Two hypotheses were considered: Hypothesis 1 The trace (item 2, item 3) originates from item 1. Hypothesis 2 The trace (item 2, item 3) originates from another pink textile. With respect to item 2, we conclude that the results provide strong support for hypothesis 1 rather than hypothesis 2. With respect to item 3, we conclude that hypothesis 1 is excluded. Item 1 is not the source of item 3. Item 3 originates from another textile.
DHRRNP	Questioned fibers recovered from the suspect's belt buckle (Item2) were consistent (indistinguishable) with the fibers of the Known section of fabric from the victim's torn dress (Item1) in macroscopic, microscopic, Micro-spectrophotometric (UV-Vis) and infrared (FTIR) characteristics. Therefore, the questioned fibers recovered from the suspect's belt buckle (Item2) could have originated from the Known section of fabric from the victim's torn dress (Item1) or another source of fibers with similar macroscopic, microscopic, micro-spectrophotometric (UV-Vis) and infrared (FTIR) characteristics. Questioned fibers recovered from the suspect's purse (Item3) were dissimilar (distinguishable) to the fibers of the Known section of fabric from the victim's torn dress (Item1). Therefore, the questioned fibers recovered from the suspect's purse (Item3) could not have originated from the Known section of fabric from the victim's torn dress (Item1).
DPRCNZ	Physical, microscopic, and instrumental comparison of the two different pink polyester fibers in Item 2 with the two different pink polyester fibers in the construction of Item 1 revealed them to be consistent with respect to physical and optical properties as well as fiber type. Therefore, the fibers recovered from the subject's belt buckle could have originated from the victim's dress, or another source with these same properties. Physical and microscopic comparison of the pink cotton fibers in Item 3 with the pink polyester fibers in the construction of Item 1 revealed them to be inconsistent with respect to physical and optical properties, as well as fiber type. Therefore, the fibers recovered from the subject's purse did not originate from the victim's dress.
E2YGER	Based on the results of FTIR analysis and on the shape and elemental composition of the fibres, as determined by SEM and EDS, the fibres from item 2 (fibres recovered from the suspect's belt buckle) cannot be excluded as having originated from item 1 (Known section of fabric from the victim's torn dress). Conversely, using the same criteria, the fibres from item 3 (fibres recovered from the suspect's purse) can be excluded as having originated from item 1.
EGRBNX	The questioned fibers recovered from the suspect's belt buckle (Item 2) were consistent (same characteristics) with the fibers of the known section of fabric from the victim's torn dress (Item 1), and therefore could have originated from the victim's dress. The questioned fibers recovered from the suspect's purse (Item 3) were inconsistent with the fibers of the known section of fabric from the victim's torn dress (Item 1), and could not have originated from the victim's dress.
EGWCZ	The questioned fibers (Item 001-2) recovered from the suspect's belt buckle that were examined could have come from the known section of the textile from the victim's torn dress (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's purse that were examined did not come from the known section of the textile from the victim's torn dress (Item 001-1).
F9WQXP	In my opinion the scientific findings provide very strong support for the assertion that the fibres recovered from the suspect's belt buckle (Item 2) originated from the victim's torn dress (Item 1) rather than they did not and the fibres match by chance. In my opinion the fibres recovered from the suspect's purse (item 3) could not have originated from the victim's torn dress (item 1) The term "Very strong support" is selected from a scale of standard terms used to express the relative level of scientific support for a proposition over its alternative, as discussed above. These terms are: Limited, Moderate, Moderately Strong, Strong, Very Strong, Extremely strong Additionally, in some instances, a proposition may be conclusively supported, if the findings are such that the alternative can be dismissed. If the

TABLE 4

WebCode	Conclusions
	findings provide no greater support for one proposition over the other, then the findings are described as neutral.
FG8RJQ	The constituent fibres of the section of the dress provided (item 1) were found to be polyester. The constituent fibres of item 2 (fibres recovered from suspects belt buckle) and item 3 (fibres recovered from the suspects purse) were found to be polyester and cotton respectively. Therefore, in my opinion, the recovered threads from item 3 could not have originated from the section of the dress provided (item 1) and were not considered further. The constituent fibres of item 1 were compared to the constituent fibres of item 2 and were found to be indistinguishable in microscopic appearance under a range of lighting conditions. The fibres were also analysed with respect to their colour and two of the fibres from item 2 were also analysed with respect to their chemical composition. The results of these tests showed that the constituent fibres of item 2 were indistinguishable from the constituent fibres of the section of dress (item 1). In assessing the significance of the findings, I have considered the following alternatives: Suspects belt buckle was in contact with victim's dress. Suspects belt buckle was not in contact with victim's dress and the fibres must have originated from another item constructed of these particular fibres (i.e. it is a chance match). The presence of fibres on the suspects belt buckle that are indistinguishable from the constituent fibres of the dress (item 1) is as I might expect if the belt buckle had been in contact with the victim's dress at some time. In addition, the fabric (item 1) does not shed its constituent fibres on contact unless damaged, therefore, this transfer/contact must have occurred at the time of, or after, the dress (item 1) was damaged (dress is described as torn in the information provided). These findings therefore are as I might expect if the first alternative were true. Whilst the fibres recovered from the suspects belt cannot be considered to be unique, they can be differentiated from the fibres of a great many other items based on their colour, type, microscopic appearance and chemical composition. Therefore, in my opinion I consider the chance of obtaining these findings, if the fibres found on the suspect's belt buckle had not originated from the victim's dress, to be relatively low. Furthermore I might also expect any fibres that did transfer to the belt buckle to be lost relatively quickly, unless they were caught/trapped in some way. Therefore, in my opinion the findings are more likely if the first alternative were true rather than the second alternative and provide strong support for the view that the suspects belt buckle has been in contact with the victim's dress rather than that it has not.
FL2P7W	Questioned fibers recovered from the suspect's belt buckle (Item 2) are not differentiated from known section of fabric from the victim's torn dress (Item 1). Fibers from Item 2 can come from the fabric of the victim's torn dress (Item 1) or from another textile material with the same characteristics. Questioned fibers recovered from the suspect's purse (Item 3) are differentiated from known section of fabric from the victim's torn dress (Item 1). Fibers from Item 3 don't come from the fabric of the victim's torn dress (Item 1).
FLKU42	1. Comparative examinations of Exhibit 001 (Fibers that compose the known section of the victim's dress) with Exhibit 002 (Questioned fibers recovered from the suspect's belt buckle) 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 dress) with Exhibit 003 (Questioned fibers recovered from the suspect's purse) 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 polyester fibers. Examination of Exhibit 003 disclosed the presence of cotton fibers.
FT323T	The fiber recovered from the suspect's belt buckle (Item 2) exhibits microscopic and optical properties consistent with those of the reference fabric from the victim's dress (Item 1) and could have originated from that source. The fiber recovered from the suspect's purse (Item 3) exhibits characteristics inconsistent with the reference fabric from the victim's dress and is therefore excluded as originating from that source.
GG6JQX	The pink polyester fibers found from suspect's belt buckle (item 2) are consistent with pink polyester

TABLE 4

WebCode	Conclusions
GKPC2Z	<p>fibers from victims torn dress (item 1). Item 2 could be originated from item 1. The pink cotton fibers found from suspect's purse (item 3) are not consistent with with pink polyester fibers from victims torn dress (item 1). Item 3 could not be originated from item 1.</p> <p>Sample 2 could have originated from the victim's torn dress.</p>
HNHVHN	<p>The questioned fiber (item2) that was recovered from the suspect belt buckle could have been originated from the victim's torn dress (item1), because of their similarites in physical properties and chemical compositions. The questioned fiber (item3) that was recovered from the suspect purse could NOT have been originated from the victim's torn dress (item1), because of their differences in physical properties and chemical compositions.</p>
HUNNDK	<p>Pinkish polyester (PET) fibers, delustered/ profiled and light pinkish polyester (PET) profiled fibers from item 2 could be originated from the Item 1. Pinkish unevenly colored vegetable, Cotton fibers from item 3 couldn't have been originated from the Item 1.</p>
JLAZCQ	<p>Microscopic examination & instrumental analysis of rep. fibers in Item 1 revealed light pink and pink to orange-pink polyester fibers. Microscopic examination & instrumental analysis of rep. fibers in Item 2 revealed light pink and pink to orange-pink polyester fibers. Microscopic examination of rep. fibers in Item 3 revealed light pink cotton fibers. Examination and comparison of rep. fibers in Items 1 & 2 were found to be similar in all measured physical, microscopic, and color properties, and chemical composition. They could have come from the same source or any other source with the same properties, and compositions. Examination and comparison of rep. fibers in Items 1 & 3 were found to be dissimilar in microscopic properties. They could not have come from the same source.</p>
K2HD8T	<p>The above exhibits were initially examined visually and stereoscopically. Exhibit 1 consisted of a section of pink woven fabric. Examination of yarn samples from the fabric indicated that it is constructed with two different types of yarn, one a lighter pink (fiber type A) and one a darker pink (fiber type B). Exhibit 2 consisted of four yarns. Two yarns were a lighter pink (fiber type A), and two yarns were a darker pink (fiber type B). Exhibit 3 consisted of four pink and white yarns all similar in appearance. Samples from the above were taken for analytical and comparison purposes. The fiber samples from Exhibit 1 and Exhibit 2 were examined via PLM and FTIR and were all determined to be polyester. Subsequently, Exhibit 1 fiber type A was compared to Exhibit 2 fiber type A, and Exhibit 1 fiber type B was compared to Exhibit 2 fiber type B. Comparison was done via microscopical methods and instrumental techniques (FTIR and MSP). No exclusionary differences were observed between the samples. Therefore, the pink fabric from the victim's torn dress (Exhibit 1), as manufactured and represented by the samples examined, could be the source of the pink fibers recovered from the suspect's belt buckle (Exhibit 2). Other textiles composed of similar fiber content and characteristics to Exhibit 1 would also be considered possible sources. The pink and white fiber samples from Exhibit 3 were examined via PLM and were determined to be cotton. The yarns of Exhibit 3 are a different color and made of a different fiber type than Exhibit 1. Therefore, the pink fabric from the victim's torn dress (Exhibit 1), as manufactured and represented by the samples examined, cannot be the source of the questioned fibers recovered from the suspect's purse (Exhibit 3). 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</p>
KCH2YQ	<p>Examinations: Visual examination, stereomicroscopy, polarized light microscopy, fluorescence microscopy, infrared spectroscopy (IR), microspectrophotometry, cross-sectioning Information: Pink questioned yarns were reportedly collected from the suspect's belt buckle (Item 2) and purse (Item 3). A known fabric sample was reportedly collected from the victim's torn dress (Item 1) for comparison to the questioned yarns. Results: The questioned yarns/fibers from Item 2 were similar in all tests performed to the known yarns/fibers from Item 1. Additionally, Items 1 and 2 were both comprised of polyester fibers. In the opinion of the examiner, the questioned yarns from the suspect's belt buckle came from either the victim's dress, as represented by Item 1, or another source with similar characteristics (Level 3 - Association). The questioned yarns/fibers from Item 3 were dissimilar in microscopic characteristics to</p>

TABLE 4

WebCode	Conclusions
KDEJZR	<p>the known yarns/fibers from Item 1 (e.g., fiber type). Item 3 was comprised of cotton fibers. In the opinion of the examiner, the victim's dress, as represented by Item 1, is excluded as a source of the questioned yarns from the suspect's purse (Elimination). Additional Remarks: Please contact the examiner if additional knowns are collected for possible further comparisons to Item 3.</p> <p>It was determined utilizing stereomicroscopic, transmitted light and polarized light microscopic, comparison microscopic and Fourier Transform Infrared Spectroscopy techniques of analysis that the questioned red colored polyester fibers identified in item 2 and known red colored polyester fibers comprising item 1 exhibit consistent characteristics. Therefore, based on the above listed analytical techniques the known fibers from item 1 cannot be eliminated as being the source of the questioned fibers from item 2. It was determined utilizing stereomicroscopic, transmitted light and polarized light microscopic techniques of analysis that item 3 exhibited the presence of red colored cotton fibers. Due to item 1 being comprised of red colored polyester, item 1 can be eliminated as being the source of the questioned fibers from item 3.</p>
KL467P	<p>Two types of pink polyester fibers in the fabric of Item 1, one from the warp and one from the weft, exhibit similarity in all tested characteristics to the two pink polyester fibers constituting the threads of Item 2. Item 3 differs from Item 1 in macroscopic characteristics, structure, and fiber composition.</p>
LE467N	<p>1. The following is the opinion of the undersigned: a. Q1(Fiber 1) could have originated from the source (Laboratory item #1) represented by K1(Fiber 1) or from another source exhibiting all of the same analyzed characteristics. No conclusions are reached about the remaining Q1 or K1 fibers. b. Q2(Fiber 1) could have originated from the source (Laboratory item #1) represented by K2(Fiber 1) or from another source exhibiting all of the same analyzed characteristics. No conclusions are reached about the remaining Q2 or K2 fibers. c. Fibers Q3 could not have originated from the source (Laboratory item #1) represented by fibers K1 and K2. 2. Since textile fibers are mass produced, it is not possible to state that a fiber originated from a particular textile source to the exclusion of all other materials composed of fibers which exhibit the same physical, optical, and chemical properties.</p>
LY8Q9F	<p>Through microscopic examination, Item 2 (Questioned fibers recovered from the suspect's belt buckle) is red fibers having similar color and physical appearances to the red fibers composing Item 1 (Known section of fabric from the victim's torn dress). However, Item 3 (Questioned fibers recovered from the suspect's purse) doesn't share similar physical appearances to Item 1 although both may look similar in color. Furthermore, according to the results of the comprehensive analytical methods mentioned above, Item 2, in which the manufactured polyester ingredient is identified, is consistent with Item 1 which is also made of polyester fibers. While Item 3, made of Cotton fibers, is not consistent with Item 1.</p>
M6T3KM	<p>Item 1 and Item 2 were both composed of pink polyester fibers of two types: one being semi-dull with a polygonal cross-section and the other being un-delustered with a triangular or wedge-shaped cross-section. The two types of fibers from both items are similar in width and morphology, Item 1 is a possible source of the analyzed fibers from Item 2. Item 3 was composed of cotton fibers which varied in color from pale pink to colorless, Item 1 is not possible source of these fibers.</p>
MD3RYL	<p>In summary, the compositions of Item 1 and Item 2 observed in spectroscopy were similar. Given the similarity in fiber morphology observed in microscopy and polarized light microscopy, as well as the comparable visible light absorption properties of the fibers, Item 2 appears to have originated from Item 1. Item 3 was cellulose type.</p>
MRNZ7K	<p>The swatch of fabric from the victims torn dress (item 1) consisted of woven material made of two types of threads. One type of thread consisted of delustered pink polyester fibres while the second type of thread consisted of slightly larger non-delustered pink polyester fibres. The fibres recovered from the suspect's belt buckle (item 2) consisted of four threads of pink fibres. Two types of threads were present. One type of thread consisted of delustered pink polyester fibres while the second type of thread consisted of slightly larger non-delustered pink polyester fibres. In relation to appearance, chemical composition, dye composition and cross section, the fibres from these threads were indistinguishable to the fibres from the corresponding threads from the torn dress (item 1). Therefore the fibres from the belt buckle may have originated from the torn dress. The fibres recovered from the suspect's purse (item 3) consisted of four threads of pink fibres. These fibres consisted of cellulose (suspected cotton) and</p>

TABLE 4

WebCode	Conclusions
	therefore could not have originated from the torn dress (item 1).
NN2RBP	<p>The following methodologies were used in the examination of this case: visual examination, physical examination, microscopy, fluorescence, FTIR and MSP. Examination of Item 1 revealed the presence of a swatch of pink woven fabric constructed of pink yarns designated as Direction A and Direction B, which were each composed of pink polyester fibers. Examination of Item 2 revealed the presence of four individual pink yarns. Two yarns were consistent in construction with the Direction A yarns in Item 1. One of these yarns was selected for further analysis. This yarn, composed of pink polyester fibers, was consistent in color, construction and composition with the Direction A yarns composed of pink polyester fibers from the fabric in Item 1. Therefore, this yarn could have originated from the same source as the fabric in Item 1. The remaining two yarns were consistent in construction with the Direction B yarns in Item 1. One of these yarns was selected for further analysis. This yarn, composed of pink polyester fibers, was consistent in color, construction and composition with the Direction B yarns composed of pink polyester fibers from the fabric in Item 1. Therefore, this yarn could have originated from the same source as the fabric in Item 1. No further analysis was performed on this item. Examination of Item 3 revealed the presence of four individual pink yarns. The construction of these yarns is not consistent with the construction of the yarns comprising the fabric in Item 1. Therefore, these yarns in Item 3 could not have originated from the same source as the fabric in Item 1. According to the Technical Procedure for the Examination of Fibers at this laboratory, if at any point during the course of examination items are found to be inconsistent with one another, analysis may be halted and a lab report issued stating a negative finding. Therefore, no further analysis to identify the generic fiber class of the fibers in Item 3 was performed.</p>
P4CTKL	<p>Item #1- Microscopic and instrumental (UV-Visible Microspectrophotometry, FTIR) examination of Item #1 revealed a section of pink-colored fabric that was constructed of numerous yarns composed of pink-colored polyester fibers (KF1A) and reddish/pink-colored polyester fibers (KF1B). Item #2- Microscopic and instrumental (UV-Visible Microspectrophotometry, FTIR) examination of Item #2 revealed two (2) sections of pink-colored yarn that was constructed of numerous, pink-colored polyester fibers (QF1A), and two (2) sections of reddish/pink-colored yarn that was constructed of numerous reddish/pink-colored polyester fibers (QF1B). Comparison of the pink-colored QF1A fibers with the known pink-colored KF1A fibers revealed that they were consistent with respect to physical characteristics, optical properties, chemical composition and fiber type. Comparison of the reddish/pink-colored QF1B fibers with the known reddish/pink-colored KF1B fibers revealed that they were consistent with respect to physical characteristics, optical properties, chemical composition and fiber type. Therefore, the QF1A and QF1B fibers (Item #2) could have originated from the known source (Item #1) as represented by the KF1A and KF1B fibers or from another textile source composed of fibers that exhibit all of the same analyzed characteristics. Item #3- Microscopic examination of Item #3 revealed four (4) sections of reddish/pink-colored yarn that was constructed of numerous reddish/pink-colored cotton fibers (QF2) which are different from the KF1A and KF1B fibers with respect to fiber type. Therefore, the QF2 fibers (Item #3) could not have originated from the source (Item #1) represented by the KF1A and KF1B fibers.</p>
QJJ7FN	<p>Exhibit 1 (CTS Item 1) consisted of one piece of pink woven fabric approximately 2 by 2 inches in size composed of two types of pink polyester fibers (one type composing the warp threads and the other type composing the weft threads). Exhibit 2 (CTS Item 2) consisted of four pink threads each approximately 2 inches in length. Two of the threads were composed of dull (delustered) pink polyester fibers. The other two threads were composed of bright (non-delustered) pink polyester fibers. The Exhibit 2 threads had similar construction to the threads composing the Exhibit 1 fabric. The pink polyester fibers composing the Exhibit 2 threads had similar chemical properties and similar microscopically observed morphology, optical properties, fluorescence, and color characteristics as the fibers composing the Exhibit 1 fabric. The threads from Exhibit 2 either originated from the source of the known fabric in Exhibit 1 or from another fabric source with similar properties. Exhibit 3 (CTS Item 3) consisted of four pink threads each approximately 2 inches in length composed of pink cotton fibers. The threads in Exhibit 3 could not have originated from the source of the known fabric in Exhibit 1 due to differences in chemical composition and microscopically observed morphology and optical properties of their fibers.</p>

TABLE 4

WebCode	Conclusions
R3TLC9	Comparative Examinations were conducted using macroscopic examination, stereomicroscopy, comparison microscopy, polarized light microscopy, and IR/FTIR spectroscopy. The fibers comprising Item 1 and Item 2 were determined to be manufactured polyester fibers and were indistinguishable with respect to color, microscopic appearance, optical properties, and infrared spectral characteristics. Based on these findings, Item 2 is consistent with Item 1 and could have originated from the same source or from another textile material with similar characteristics. The fibers in Item 3 were identified as vegetable rayon fibers. Differences in fiber type, microscopic morphology, and IR/FTIR spectra excluded Item 3 as having originated from Item 1.
RANQ4P	Pink polyester fibers and mauve polyester fibers found in Item 2 were indistinguishable from the pink polyester and mauve polyester fibers in Item 1 in color, generic fiber type, and microscopic characteristics (Type 3 Association: Association with conventional characteristics). * Pink cotton fibers found in Item 3 were different from the pink polyester and mauve polyester fibers in Item 1 (Elimination). ** *This means that the questioned fibers recovered from the suspect's belt buckle could have come from the victim's torn dress. **This means that the questioned fibers recovered from the suspect's purse did not originate from the victim's torn dress. 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 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.
RMG8UB	Lustrous magenta polyester fibers and delustered magenta polyester fibers recovered from Item 2 exhibit the same microscopic characteristics and optical properties as the lustrous magenta polyester and delustered magenta polyester fibers comprising Item 1. Accordingly, these fibers are consistent with originating from Item 1 or another textile or textiles comprised of fibers that exhibit the same microscopic characteristics and optical properties. The 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. The specimens were examined visually and using stereomicroscopy, comparison microscopy, polarized light microscopy, fluorescence microscopy, and instrumentally using microspectrophotometry and Fourier transform infrared spectroscopy.
T4KWVE	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.
TAMDVM	The known section of fabric from the victim's torn dress in item 1 comprised pink polyester fibres. The questioned fibres from the suspect's belt buckle in item 2 comprised pink polyester fibres, agreeing in

TABLE 4

WebCode	Conclusions
	colour, fibre type and microscopic appearance under various lighting conditions with the control pink polyester fibres from the known section of fabric from the victim's torn dress in item 1, indicating that they could have originated from the same source. The questioned fibres from the suspect's purse in item 3 differed in fibre type with the control pink polyester fibres from the known section of fabric from the victim's torn dress in item 1, indicating that they did not originate from the same source. Based on the above laboratory findings, there could have been a contact having occurred between the victim's dress and the suspect's belt buckle, rendering a transfer of textile fibres from the victim's dress in item 1 to the suspect's belt buckle in item 2.
TN49BJ	Item 1 comprised a single piece of pink woven fabric consisting of two types of microscopically light red polyester yarns. Item 2 comprised four yarns consisting of two types of microscopically light red polyester, with each type contained two yarns. Item 3 comprised four microscopically colourless to light red cotton yarns. In my opinion, 1. based on yarn characteristics, microscopic characteristics, fluorescence, instrumental colour analysis and chemical composition of the fibres, the four microscopically light red polyester yarns from Item 2 could have originated from Item 1, or other sources containing yarns with similar characteristics. 2. based on yarn characteristics and microscopic characteristics, the four microscopically colourless to light red cotton yarns in Item 3 did not originate from Item 1.
TW2ZJD	High probability for the questioned fibers recovered from the suspect's belt buckle (Item 2) to have originated from the fabric of the victim's torn dress (Item 1). Questioned fibers recovered from the suspect's purse (Item 3) could not have originated from the fabric of the victim's torn dress (Item 1).
TYKTVF	Item 2 may have originated from item 1. Item 3 is not consistent with item 1.
UC9EEF	Considering the similar morphology, color, cross-section and behaviour under fluorescence light, no significant differences were observed between the fibers composing Item 1 (wrap and weft) and the fibers corresponding to Item 2. The analysis performed by FTIR and Raman determined that both samples were indistinguishable. Item 2 could have originated from the victim's dress (Item 1). Considering the different morphology, colour, cross-section and behaviour under fluorescence light as well as the analysis performed by FTIR and Raman Item 3 could have not originated from the victim's dress (Item 1).
UF8RYK	Item Fiber Type 1 Bright and moderately delustered polyester 2 Bright and moderately delustered polyester 3 Cotton Item Comparison to Items Conclusion 1 2 Type 3 - Association 1 3 Elimination
UKYZJD	It should be noted that individual textile fibers do not possess enough distinct microscopic characteristics to be positively identified as originating from a particular garment to the exclusion of all other garments. Fibers from the pink polyester threads recovered from the suspect's belt buckle (Item #2) exhibit the same physical, chemical and microscopic properties as the reference fibers taken from the pink polyester fabric recovered from the victim's torn dress (Item #1). These pink polyester fibers (Item #2) could have originated from the victim's torn dress (Item #1). The pink cotton fibers recovered from the suspect's purse (Item #3) do not exhibit the same physical and microscopic properties as the reference fibers taken from the pink polyester fabric recovered from the victim's torn dress (Item #1).
UXQLP9	The light pink and dark pink threads recovered from Item 2 (Your Item 2) have the same color, construction, and composition as the light pink and dark pink threads that comprise the warp and weft of the Item 1 fabric sample (Your Item 1). Accordingly, the light pink and dark pink threads are consistent with originating from the victim's dress that Item 1 was sampled from or from another item with the same color, construction, and composition. The pink threads recovered from Item 3 (Your Item 3) differ in macroscopic construction and color, and are comprised of a different fiber type than the light pink and dark pink threads comprising the warp and weft of the Item 1 fabric sample (Your Item 1). Accordingly, the pink 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.
UZBD2C	Item 1 is composed of two types of polyester and is similar in composition and polarization shape to the

TABLE 4

WebCode	Conclusions
	constituent fibers of Item 2. Item 3 is made of cotton fiber and is different from Item 1 in shape and composition.
VECAJ	The following methodologies were used in the examination of this case: visual examination, physical examination, microscopy, fluorescence, FTIR, and MSP. Examination of Item 1 revealed the presence of pink woven fabric comprised of two types of yarns designated as Direction A and Direction B. Examination of Item 2 revealed the presence of four pink yarns. Two yarns were designated as Type 1 and the remaining two yarns designated as Type 2. Two Type 1 pink yarns were consistent in construction with the Direction A yarns in Item 1. One yarn was analyzed further and found to be comprised of polyester fibers and consistent in color, composition, and structure with the Direction A pink yarn composed of polyester fibers from the fabric in Item 1. Therefore, the Type 1 pink yarn in Item 2 could have originated from the same source as the Direction A pink yarn in Item 1. No further analysis was performed on the remaining yarn. Two Type 2 pink yarns were consistent in construction with the Direction B yarns in Item 1. One yarn was analyzed further and found to be comprised of polyester fibers and consistent in color, composition, and structure with the Direction B pink yarn composed of polyester fibers from the fabric in Item 1. Therefore, the Type 2 pink yarn in Item 2 could have originated from the same source as the Direction B pink yarn in Item 1. No further analysis was performed on the remaining yarn. Examination of Item 3 revealed the presence of four pink yarns. The four pink yarns from Item 3 are not consistent in construction with either direction of the pink yarns composed of polyester fibers from the fabric in Item 1. Therefore, these pink yarns could not have originated from the pink fabric in Item 1. According to the Technical Procedure for the Examination of Fibers at this laboratory, if at any point during the course of examination items are found to be inconsistent with one another, analysis may be halted and a lab report issued stating a negative finding. Therefore, no further analysis to identify the generic fiber class of the fibers in Item 3 was performed.
VNFJ69	All three sample fibers were analyzed via optical microscopy, Fourier transform infrared spectroscopy (FTIR), and scanning electron microscopy (SEM). Optical and electron microscopy imaging showed samples 1 (known section of fabric from the victim's torn dress) and 2 (questioned fibers recovered from the suspect's belt buckle) have similar cross sectional shape and diameter (approximately 18um), while fibers from sample 3 (questioned fibers recovered from the suspect's purse) appear to have a rectangular/oval cross section. FTIR analysis confirmed that samples 1 and 2 are comprised of the same material (polyester), differing from sample 3 (cotton).
W6FTLJ	Based on the results of the examinations performed, I am of the opinion that: 1) The questioned fibres from Item 3 (suspect's purse), were determined to be different to the fibres from Item 1 (victim's dress), and as such the victim's dress could not be a source for the fibres recovered from the suspect's purse. 2) The questioned fibres from Item 2 (suspect's belt buckle), could not be differentiated from the fibres from Item 1 (victim's dress), based on thread construction and composition, microscopic features, colour and fluorescent properties, and therefore the fibres from the belt buckle could have come from Item 1 (victim's dress). 3) It should be noted that garments such as the victim's dress are commercially manufactured, and whilst the fibres recovered from the suspect's belt buckle could have come from the victim's dress, another dress of the same type or garment composed of the same fibres cannot be excluded either.
WC3J9E	Examinations: Visual examination, stereomicroscopy, polarized light microscopy, fluorescence microscopy, microspectrophotometry (MSP), infrared spectroscopy (IR), cross-sectioning Information: Pink questioned threads were reportedly collected from the suspect's belt buckle (Item 2) and purse (Item 3). A known pink fabric sample was reportedly collected from the victim's dress (Item 1) for comparison to the questioned threads. The fabric sample reportedly from the victim's dress was comprised of a woven fabric construction with two different fiber types. Results: The questioned threads/fibers from Item 2 were composed of two different types of pink fibers. Both of these types were similar in all tests performed to the two different types of known threads/fibers from Item 1. Additionally, Items 1 and 2 were both composed of polyester fibers. In the opinion of the undersigned, the questioned threads from the suspect's belt buckle came from either the victim's dress, as represented by Item 1, or another source with similar characteristics (Level 3 – Association). The presence of two different fiber types in these items may increase the significance of this association. The questioned yarns/fibers from Item 3

TABLE 4

WebCode	Conclusions
	<p>were dissimilar in microscopic characteristics to the known yarns/fibers from Item 1 (e.g., fiber type). Item 3 was composed of cotton fibers. The victim's dress, as represented by Item 1, is excluded as a source of the questioned yarns from the suspect's purse (Elimination). Additional Remarks: Please contact the undersigned if additional known fabric samples are collected for possible further comparisons to Item 3.</p>
WME7W7	<p>The sample consists of a CTS Fiber Analysis Test No. 26-5439 containing three items described as follows: Item 1: Known section of fabric from the victim's torn dress. Item 2: Questioned fibers recovered from the suspects belt buckle. Item 3: Questioned fibers recovered from the suspect's purse. The fiber type determination for Item 1 and item 2 is manufactured, polyester fibers and item 3 are made of vegetable, cotton fiber. Methods: AATCC TM 20-2021 Fiber Analysis: Qualitative (Date performed: 02/13/26 to 02/17/2026).</p>
XUDTN7	<p>The pink polyester irregular round fibers recovered from Item 2 exhibit the same microscopic characteristics and optical properties as the pink polyester irregular round fibers recovered from Item 1. The pink polyester triangular fibers recovered from Item 2 exhibit the same microscopic characteristics and optical properties as the pink polyester triangular fibers recovered from Item 1. Accordingly, these fibers are consistent with originating from the same source as Item 1, or another item comprised of fibers that exhibit the same microscopic characteristics and optical properties. Fibers found in Item 3 are microscopically dissimilar to the fibers comprising Item 1. Accordingly, these fibers are not consistent with originating from Item 1. The fibers have been preserved for possible future microscopic comparison purposes. The specimens were examined visually using stereomicroscopy, comparison microscopy, fluorescence microscopy, polarized light microscopy, and instrumentally using microspectrophotometry and infrared spectroscopy, where appropriate.</p>
XVA9XH	<p>The material from the damaged dress was a woven piece of material constructed from two different types of pink polyester threads. Four pink threads were recovered from the suspects belt (Item 2). They were found to match the two different pink polyester threads from the damaged dress fabric (item 1). Four pink threads were recovered from the suspects purse (Item 3). They were found to be composed of cotton fibres which did not match the fibres from the damaged dress (item 1) The above findings offer strong support for the view that the the threads found on the belt originated from the damaged dress (item1) rather than some other 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.</p>
YEJQK8	<p>Item 1, item 2, and item 3 were comparatively analyzed via FTIR, MSP, and Pyrolysis-GC/MS. Item 1 and item 2 were identified as polyester fibers sharing similar color and chemical composition. Item 3 is a cotton fiber.</p>
ZQTM3F	<p>Items 1-3 were examined and compared in order to determine if there is evidence of an association between the victim's torn dress and the fibers recovered from the suspect's belt or purse. Standard The Item 1 standard from the victim's torn dress was found to contain the following populations of pink yarns: Population A : Two (2) light pink, untwisted yarns comprised of light pink polyester fibers Population B: Two (2) bright pink, lightly twisted yarns comprised of bright pink polyester fibers This item was used as a standard for comparison purposes. Items associated with the suspect Item 2, questioned fibers from the suspect's belt, was opened and found to contain the following types of pink yarns: Population A: Two (2) light pink, untwisted yarns Population B: Two (2) bright pink, lightly twisted yarns The yarns were macroscopically and microscopically examined and compared with the pink yarns comprising the Item 1 standard. These examinations and comparisons revealed that both populations of pink yarns from Item 2 are consistent in color, construction, and appearance with the two populations of pink yarns comprising the Item 1 standard. Detailed examinations of the pink yarns revealed they are comprised of two types of pink polyester fibers. Population A: Light pink polyester fibers Population B: Bright pink polyester fibers Comparative examinations between at least thirty (30) light pink polyester fibers from Population A and the light pink polyester fibers comprising the Population A yarns from the Item 1 standard revealed that they are consistent in color, appearance, fiber type, and microscopic characteristics. Further instrumental examinations and comparisons of color of the thirty (30) light pink polyester fibers collected from the suspect's belt revealed that they are consistent with the light pink</p>

TABLE 4

WebCode	Conclusions
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polyester fibers comprising the Item 1 standard. Therefore, at least thirty (30) of the light pink polyester fibers from Item 2 could have originated from the Item 1 standard of the victim’s torn dress. Comparative examinations between at least seventy (70) bright pink polyester fibers from Population B and the bright pink polyester fibers comprising the Population B yarns from the Item 1 standard revealed that they are consistent in color, appearance, fiber type, and microscopic characteristics. Further instrumental examinations and comparisons of color of thirty (30) bright pink polyester fibers collected from Item 2 revealed that they are consistent with the bright pink polyester fibers comprising the Item 1 standard. Therefore, at least thirty (30) of the bright pink polyester fibers from Item 2 could have originated from the Item 1 standard from the victim’s torn dress. Item 3, questioned fibers from the suspect’s purse, was opened and found to contain four (4) pink yarns. The yarns were macroscopically and microscopically examined and compared with the pink yarns comprising the Item 1 standard. These comparisons revealed that the pink yarns from Item 3 are different in construction from the pink yarns comprising the Item 1 standard. Detailed examinations of the pink yarns revealed that they are comprised of pink cotton fibers. Therefore, the pink yarns in Item 3 could not have originated from the victim’s torn dress as represented by the Item 1 standard.

Additional Comments

TABLE 5

WebCode	Additional Comments
2J3RF3	We have assumed that Item 1 is a representative sample from the fabric of the victim's dress.
6VPZRZ	This laboratory does not report fiber comparisons.
8YYXA8	Selected yarns from items 1 - 3 were screened using a stereomicroscope, a polarized light microscope, and a fluorescence microscope. Two fibers from item 1 (designated as A and B), four fibers from item 2 (designated as A - D), and four fibers from item 3 (designated as A - D) were selected and were also examined using a compound microscope, a microspectrophotometer (MSP) and a Fourier-transform infrared spectrometer (FTIR) microscope. Hand cross sections were made of the selected fibers from items 1 and 2. Photographs were taken of the items, saved on a DVD, and retained in the case package.
CZXWB2	Test is very simple. Traces are very big Scenario is not realistic.
KCH2YQ	Association Scale would be included.
M6T3KM	Though de-lustering agents were observed microscopically, attempts to evaluate their composition by SEM/EDS were not successful.
MD3RYL	Item 3 seems to be composed of mercerized cotton fiber based on the microscopic observations and IR results.
NN2RBP	At this laboratory, fiber analyses with a negative association stop when the difference is noted; the exam does not continue to identify the fiber types.
P4CTKL	It should be noted that textile fibers are mass produced and it is not possible to state that a questioned fiber originated from a particular source to the exclusion of all other textile products composed of fibers that exhibits the same microscopic characteristics and/or chemical composition.
R3TLC9	IR/FTIR analysis of Item 3 (fibers recovered from the suspect's purse) indicated additional spectral features consistent with possible pharmaceutical and food-related residues, including misoprostol and materials comparable to dessert or food components. These findings are indicative only and were not confirmed by additional analytical methods.
RMG8UB	Methods: 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. Interpretation: Fibers can differ as to type (e.g. rayon, cotton), color, shape, size, microscopic features (e.g. delusterant, 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 present in 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 hair/fiber examination does not necessarily mean the persons/items of interest had no contact. A number of factors can produce this result, including: 1) Hair/fiber evidence may not have transferred. 2) Hairs/fibers that did transfer may have been lost prior to submission to the laboratory. 3) The hairs/fibers transferred or the known sample submitted may not be representative of the source. 4) The hairs/fibers may be from a different source.

TABLE 5

WebCode	Additional Comments
TW2ZJD	In Item 1 and Item 2 there are two morphological types of manufactured fibers. One is undull man-made textile fiber, and the other is semi-dull man-made textile fiber. Both are polyesters.
UF8RYK	Type 3 - Association: Items are consistent with observed characteristics (physical and/or chemical) and could have originated from the same source. Because other items have been manufactured that could also be consistent with observed characteristics, an individual source cannot be determined. Elimination - Items are dissimilar in observed characteristics (physical and/or chemical) and did not originate from the same source.
WC3J9E	An association scale would be included.
ZQTM3F	Items 1 and 2 were examined macroscopically, by stereomicroscopy, brightfield microscopy, polarized light microscopy, fluorescence microscopy, and by Fourier transform infrared microspectroscopy. Item 3 was examined macroscopically, by stereomicroscopy, brightfield microscopy, and by polarized light microscopy. Items 1-3 are being transferred to the Evidence Section for return to your agency. Microscope slides created during analysis are being returned with Items 1-3. Questions regarding this report should be addressed to: [Email]

-End of Report-
(Appendix may follow)

Test No. 26-5439: Fibers Analysis

DATA MUST BE SUBMITTED BY **March 16, 2026, 11:59 p.m. EDT** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: GELHTP

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 a homicide in a parking lot. The victim was discovered wearing a dress which had been torn. A witness heard screams and saw a woman running away from the area and alerted police. The suspect was apprehended in the vicinity of the attack later that same night. Police recovered fibers that were stuck to the woman's belt buckle and purse, which were similar in color to the victim's torn dress. Police are requesting you to examine the fibers, report their identification(s), and determine if the recovered fibers found stuck to the suspect's belt buckle or purse could have originated from the victim's torn dress.

Items Submitted (Sample Pack FIBR):

Item 1: Known section of fabric from the victim's torn dress.

Item 2: Questioned fibers recovered from the suspect's belt buckle.

Item 3: Questioned fibers recovered from the suspect's purse.

1.) Could either of the questioned fibers recovered from the suspect's belt buckle (Item 2) or the suspect's purse (Item 3) have originated from the victim's torn dress (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:

Item 2:

Item 3:

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

Macroscopic Exam IR/FTIR Microspectrophotometry
 Solubility Tests Cross-Section Melting Point

Other (specify):

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

Note: Please use appropriate punctuation to indicate the end of sentences, sections, and statements in the free-form space below. Extra spacing and returns used for separation within your text will not transfer and may cause your information to be illegible in the Summary Report. The use of lists and tabular formats to deliver information is also cautioned against, as these do not transfer.

5.) Additional Comments

Note: Please use appropriate punctuation to indicate the end of sentences, sections, and statements in the free-form space below. Extra spacing and returns used for separation within your text will not transfer and may cause your information to be illegible in the Summary Report. The use of lists and tabular formats to deliver information is also cautioned against, as these do not transfer.

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) Elastoeester

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.

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Laboratory Name

Location (City/State)