



Paint Analysis

Test No. 22-5452 Summary Report

Each sample set consisted of one item containing a known paint sample and two items containing questioned paint chips. Participants were requested to compare the items and report their findings. Data were returned from 51 participants and are compiled in the following tables:

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

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

Manufacturer's Information

Each sample set contained three items consisting of automotive paint samples. Item 1 was a known paint sample representative of the damaged area of the suspect's vehicle. Items 2 and 3 were sets of questioned paint chips recovered from the parked car and street sign pole. Participants were requested to examine the questioned paint chips and determine if either could have originated from the damaged area of the suspect's vehicle.

The paint samples in Items 1 and 2 were prepared from the same automotive paint panel. The test panel was described by the supplier as a coated aluminum coil substrate panel. The panel used for Item 3 was made with the same basecoat and clear coat, but contained a different primer than the panel used for Items 1 and 2.

SAMPLE PREPARATION:

The panels used for this test were inspected for defects, and the areas containing defects were not used.

ITEMS 1 and 2 (ASSOCIATION): For the known Item 1, the paint panel was cut into approximately 1/2" x 1/2" wide pieces and one piece was packaged into a glassine bag and a pre-labeled Item 1 coin envelope. For the associated Item 2 samples, paint chips were cut into approximately 1/4" x 1/4" wide pieces. Two of these pieces were packaged into a glassine bag and then a pre-labeled Item 2 coin envelope. This process was repeated until the desired quantity was obtained. Items 1 and 2 were taken in close spatial proximity to one another, within four inches, and were kept together as an identification group and packaged into the sample pack as described below.

ITEM 3 (ELIMINATION): For the questioned Item 3, the designated paint panel was cut into approximately 1/4" x 1/4" wide pieces. Two of these pieces were packaged into a glassine bag and then a pre-labeled Item 3 coin envelope. This process was repeated until the desired quantity was obtained. Item 3 was packaged into the sample pack as described below.

SAMPLE SET ASSEMBLY: For each sample set, Items 1, 2, and 3 were placed in a pre-labeled envelope. The sample pack was sealed with invisible tape. This process was repeated until all of the sample sets were prepared. Once verification was completed, all sample packs were further sealed with a piece of evidence tape and initialed "CTS".

VERIFICATION: The expected association results were confirmed by predistribution laboratories who used the following combined list of techniques: Fluorescence, FTIR, Polarized Light, Stereomicroscopy, SEM/EDX, XRS/XRF, Pyrolysis GC, and solubility/chemical methods.

Summary Comments

This test was designed to allow participants to assess their proficiency in the examination, comparison, and interpretation of multi-layered automobile paint samples. Each sample set consisted of three items with layered paint and primer; one known sample (Item 1) and two questioned samples (Items 2 and 3) were cut from aluminum substrate panels. Items 1 and 2 came from the same automotive paint panel with the same basecoat, primer, and clear coat. Item 3 was prepared with the same basecoat and clear coat, but contained a different primer (Refer to Manufacturer's Information for preparation details).

Of the 51 participants that reported examination results, 48 (94%) participants identified Item 2 and eliminated Item 3 as having originated from the same source as the Item 1 known paint sample. The remaining three participants either eliminated Item 2 and identified Item 3, eliminated both Items 2 and 3, or was inconclusive for Item 2 and eliminated Item 3 as having originated from the Item 1 known paint sample.

The most common examination methods utilized include, Stereomicroscope (96%), FTIR (92%), and SEM/EDX (49%).

Examination Results

Could the questioned paint chips recovered from the damaged are of the parked car in the parking lot (Item 2) and/or from the street sign pole (Item 3) have originated from the damaged area of the suspect's vehicle as represented by Item 1?

TABLE 1

Item 1			Item 1		
WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
2C3YDD	Yes	No	JYYPXT	Yes	No
2QMDFC	Yes	No	K64LLY	Yes	No
3BCW8P	Yes	No	KDXQEZ	Yes	No
3T7YHY	Yes	No	KFYU62	Yes	No
4R7CKK	Yes	No	L4NLZP	Yes	No
4XXJ6E	Yes	No	LFYBF7	No	Yes
6JFT27	Yes	No	PBR2VD	Yes	No
8GYEPG	Yes	No	PKGLHY	Yes	No
8RWCCF	Yes	No	PLUC9V	Yes	No
9YTT3C	Yes	No	PMNZQQ	Yes	No
BPZXF2	Inc	No	PYXK7D	Yes	No
D3CGLY	Yes	No	Q2GZAD	Yes	No
DPP82E	No	No	Q4N9KH	Yes	No
DYFQH9	Yes	No	RL7V6X	Yes	No
DZVRMV	Yes	No	RQXXAX	Yes	No
G6UFRT	Yes	No	TW6LNK	Yes	No
GTWU6U	Yes	No	U7J3UV	Yes	No
H4HZXR	Yes	No	UBYVKN	Yes	No
HBXY9W	Yes	No	UTE8BU	Yes	No
HR37MY	Yes	No	V2MXFH	Yes	No
J7XA4U	Yes	No	VU3ZMN	Yes	No
JHRBYJ	Yes	No	WFZQGU	Yes	No
JU4TET	Yes	No	WJ2WUE	Yes	No

TABLE 1

WebCode	Item 1		WebCode	Item 1	
	Item 2	Item 3		Item 2	Item 3
WJWJ94	Yes	No			
WQKZ2G	Yes	No			
WXKEQN	Yes	No			
XMHGCU	Yes	No			
ZYHWGF	Yes	No			

Examination Response Summary				Participants: 51
	Responses	Item 1		
		Item 2	Item 3	
Yes	48 (94.1%)	1 (2.0%)		
No	2 (3.9%)	50 (98.0%)		
Inc	1 (2.0%)	0 (0%)		

Examination Methods

TABLE 2

WebCode	Stereomicroscope	Polarized Light	Fluorescence	Pyrolysis GC	FTIR	Solubility / Chemical	Microspectrophotometry	XRF / XRS	SEM / EDX	Other
2C3YDD	✓	✓			✓					
2QMDFC	✓				✓			✓		Raman Spectroscopy (laser source 514.5nm, 632.8nm,785nm)
3BCW8P	✓				✓					
3T7YHY		✓			✓	✓				
4R7CKK	✓				✓	✓				
4XXJ6E	✓	✓	✓		✓	✓		✓		
6JFT27	✓	✓		✓	✓	✓			✓	
8GYEPG	✓				✓				✓	
8RWCCF	✓				✓					
9YTT3C	✓		✓		✓			✓		Raman spectroscopy
BPZXF2	✓	✓	✓			✓				Cross-sections
D3CGLY	✓		✓	✓	✓					
DPP82E	✓									Laser Induced Breakdown Spectroscopy (LIBS)
DYFQH9	✓				✓	✓				
DZVRMV	✓	✓	✓	✓	✓				✓	
G6UFRT	✓				✓			✓		fluorescence
GTWU6U	✓	✓	✓		✓	✓		✓		
H4HZXR	✓	✓		✓	✓				✓	
HBXY9W	✓				✓	✓		✓		
HR37MY	✓	✓	✓		✓					RamanMicroscopy
J7XA4U	✓	✓	✓		✓	✓		✓		
JHRBYJ					✓				✓	

TABLE 2

WebCode	Stereomicroscope	Polarized Light	Fluorescence	Pyrolysis GC	FTIR	Solubility / Chemical	Microspectrophotometry	XRF / XRS	SEM / EDX	Other
JU4TET	✓				✓					✓
JYYPXT	✓				✓		✓			✓
K64LLY	✓		✓		✓					
KDXQEZ	✓	✓	✓				✓			MSP, Raman
KFYU62	✓			✓	✓					
L4NLZP	✓	✓			✓				✓	Pyrolysis GC-MS
LFYBF7	✓					✓				
PBR2VD	✓	✓			✓					✓
PKGLHY	✓				✓	✓				
PLUC9V	✓				✓					✓
PMNZQQ	✓				✓					microtoming
PYXK7D	✓		✓		✓		✓	✓		
Q2GZAD	✓				✓					✓
Q4N9KH	✓	✓	✓	✓	✓					
RL7V6X	✓		✓		✓					Raman 532, 638, 785
RQXXAX	✓		✓		✓					
TW6L NK	✓				✓		✓		✓	Pyrolysis GC-MS
U7J3UV	✓		✓	✓	✓			✓		
UBVKN	✓	✓	✓		✓					✓
UTE8BU	✓				✓					✓
V2MXFH	✓				✓					Optical microscopy, Raman spectroscopy
VU3ZMN	✓		✓		✓		✓			Raman spectroscopy, LA-ICP-MS
WFZQGU	✓				✓					Raman

TABLE 2

WebCode	Stereomicroscope	Polarized Light	Fluorescence	Pyrolysis GC	FTIR	Solubility / Chemical	Microspectrophotometry	XRF / XRS	SEM / EDX	Other
WJ2WUE	✓	✓	✓		✓					
WJWJ94	✓			✓	✓			✓		PGC with Mass Spec detector, Backscatter electron imaging
WQKZ2G	✓	✓		✓	✓			✓		
WXKEQN	✓	✓	✓		✓					
XMHGGU	✓				✓					
ZYHWGF	✓		✓		✓	✓		✓		Compound Microscopy

Response Summary										Total Participants: 51
	Stereomicroscope	Polarized Light	Fluorescence	Pyrolysis GC	FTIR	Solubility/chemical	Microspectrophotometry	XRS/XRF	SEM/EDX	
Participants	49	16	21	10	47	6	11	2	25	
Percent	96%	31%	41%	20%	92%	12%	22%	4%	49%	

Conclusions

TABLE 3

WebCode	Conclusions
2C3YDD	<p>Paint from the suspect's vehicle (item 1) consists of four layers. The layer structure is consistent with a regular car paint system (primer, surfacer, effect layer, clearcoat). The individual paint layers of item 1 were compared to those recovered from the parked car (item 2) and the street sign pole (item 3) using microscopy and FTIR. Two hypothesis are proposed to evaluate the obtained results: Hypothesis 1: The suspect's vehicle is the source of the of the questioned paint. Hypothesis 2: An arbitrary other yellow car is the source of the of the questioned paint. The relevant population described in hypothesis 2 consists of yellow cars, as cars are the most likely cause of the described damages from which items 1 and 2 were recovered. In addition, the color of the source (yellow) is clear from the obtained traces. The set of hypotheses will be evaluated independently for items 2 and 3. Item 2: The paint obtained as item 2 matches item 1 in all examined aspects, which is consistent with our expectation if hypothesis 1 is true. The probability of finding these results if hypothesis 2 is true is very low. We conclude that the results strongly support the hypothesis that the suspect's vehicle is the source of item 2 Item 3: The color and chemical composition of one of the layers in item 3 differs from item 1. This is not compatible with hypothesis 1. We conclude that hypothesis 2 is true which implies that the suspect's car is not the source of item 3.</p>
2QMDFC	<p>Questioned paint chips recovered from the damaged area of the parked car in the parking lot (Item 2) could have originated from the damaged area of the suspect's vehicle represented by Item 1. Questioned paint chips recovered from the street sign pole (Item 3) could not have originated from the damaged area of the suspect's vehicle represented by Item 1.</p>
3BCW8P	<p>1) The known paint sample representative of the damaged area of the suspect's vehicle (item 1), and the questioned paint chips recovered from the parked car in the parking lot (item 2), consist of a three layers paint system with the following layer structure: 1. Colorless styrene modified acrylic-urethane-melamine enamel clear coat, 2. Yellow isophthalic-polyester-melamine enamel base coat, and 3. Gray acrylic-melamine with china clay enamel primer. 2) The known paint sample representative of the questioned paint chips recovered from the street sign pole (item 3) consist of a four layers paint system with the following layer structure: 1. Colorless styrene modified acrylic-urethane-melamine enamel clear coat, 2. Yellow isophthalic-polyester-melamine enamel base coat, 3. White isophthalic-polyester-melamine with barium sulfate enamel coat, and 4. Gray isophthalic-polyester-melamine with barium sulfate enamel primer. 3) The three layered paint samples in items 1 and 2 matched in colors, textures and chemical composition. It is concluded that these fragments may come from the same vehicle, or from another vehicle that specifically has the same original three-layer finish (same layer sequence, physical properties and chemical composition) and the same type of damage caused by the event under investigation. 4) The paint chips in item 1 and 2 match in the physical and chemical properties studied of the clear coat and base coat, but don't match in the remaining layers. It was concluded that the paint in these items don't have a common origin.</p>
3T7YHY	<p>It has been determined that the paint sample numbered 1 and sent to us has physical and chemical properties similar to the paint sample numbered 2. It was determined that the paint sample numbered 3 showed different physical and chemical properties with the paint samples numbered 1 and 2.</p>
4R7CKK	<p>1) The know paint sample representative of the damage area of the suspect's vehicle (item 1), the questioned paint chips recovered from the parked car in the parking lot (item 2), consist to three layers paint system with the following layer structure: 1. clear coat acrylic-urethane-melamine modified with styrene with talc, 2. yellow isoftalic polyester-melamine modified with urethane with barium sulfate and talc and 3. drak gray</p>

TABLE 3

WebCode	Conclusions
	<p>acrylic-melamine with china clay. 2) The questioned paint chips recovered from the street sign pole (item 3), consist to four layers paint system with the following layer structure: 1. clear coat acrylic-urethane-melamine modified with styrene with talc, 2. yellow isoftalic polyester-melamine modified with urethane with barium sulfate and talc, 3. lighth gray tereftalic polyester-melamine with barium sulfate, talc and calcium carbonate and 4. dark gray tereftalic polyester-melamine with barium sulfate, talc and calcium carbonate. 3) The three layered paint chips in items 1 and 2 matches in all properties investigated, particularly in colors, textures, types, layer sequence and chemical composition. This indicates that both signs could share a common origin. The difficulty in associating them with certainty lies in the fact that it is only possible to compare three layers of paint with common characteristics that are not very individualizing. 4) The know paint sample representative of the damage area of the suspect's vehicle (item 1) and the questioned paint chips recovered from the street sign pole (item 3), presents similar macroscopic, microscopic and physical characteristics, particularly in the two outermost layers, however, the presence of a light gray inner layer which is absent in the fragment of item1 and the difference in the chemical composition of the innermost layer of both items (1 and 3), does not allow them to associate with each other.</p>
4XXJ6E	<p>Examination and comparison of representative paint chips in Items 1 and 2 were found to be similar in all measured microscopic, chemical, elemental, and color properties. They could have come from the same source or any other source with the same properties. Examination and comparison of representative paint chips in Items 1 and 3 were found to be dissimilar in all measured microscopic and chemical properties. They could not have come from the same source.</p>
6JFT27	<p>CONCLUSIONS: The questioned paint recovered from the parked car in the parking lot (item 2) is the same distinct type of paint as the known paint from the damaged area of the suspect's vehicle (item 1) and originated either from that source or another source of automotive paint having the same distinct characteristics. The questioned paint recovered from the street sign pole (item 3) did not originate from the area/panel of the suspect's vehicle represented by item 1. RESULTS: The questioned paint recovered from the parked car (item 2) and the street sign pole (item 3) were examined for the purpose of determining whether or not there is any paint present like that on the suspect's vehicle (item 1). The paint standard from the suspect's vehicle has the following layer structure: 1. Colorless acrylic-melamine-urethane enamel clearcoat 2. Medium yellow acrylic-polyester-melamine-urethane enamel basecoat 3. Medium gray polyester-melamine-urethane enamel primer 4. Dark gray polyester-melamine-urethane enamel primer This paint exhibits characteristics typical of an original automotive finish and was used for comparison with questioned paint recovered from the parked car (item 2) and the street sign pole (item 3). Examination and comparison of the questioned paint recovered from the parked car (item 2) with item 1 revealed they are alike with respect to layer structure, layer colors, layer textures, microchemical reactivities, binder characteristics, and pigment characteristics. It is therefore concluded that the questioned paint recovered from the parked car (item 2) is the same distinct type of paint as that on the suspect's vehicle (item 1) and originated either from that vehicle, or from another source of automotive paint having the same distinct characteristics. The questioned paint recovered from the street sign pole (item 3) has the following layer structure: 1. Colorless clearcoat 2. Medium yellow basecoat 3. Light gray primer 4. Dark gray primer Examination and comparison of the questioned paint recovered from the street sign pole (item 3) with item 1 revealed they are dissimilar with respect to layer structure and color of layer 3. It is therefore concluded that the questioned paint recovered from the street sign pole (item 3) did not originate from the area/panel of the suspect's vehicle represented by item 1. METHODS OF ANALYSIS: Examinations were performed visually, by stereo microscopy, brightfield/polarized light comparison microscopy, microchemical tests, Fourier transform infrared microspectroscopy, pyrolysis gas chromatography, and scanning</p>

TABLE 3

WebCode	Conclusions
	electron microscopy/energy dispersive x-ray analysis.
8GYEPG	The questioned paint chips recovered from the parked car in the parking lot, marked "Item 2", could have originated from the same source as the control paint representative of the damaged area of the suspect's vehicle, marked "Item 1", or another source of paint with similar characteristics. The questioned paint chips recovered from the street sign pole, marked "Item 3", did not originate from the same source as the control paint representative of the damaged area of the suspect's vehicle, marked "Item 1".
8RWCCF	1. Exhibit 2 originated either from the source of Exhibit 1 or from another source of physically and chemically indistinguishable paint. 2. Exhibit 3 did not originate from the source of Exhibit 1.
9YTT3C	Based on visual observations with stereomicroscopy and the analytical result from infrared spectroscopy ITEM 3 can be distinguished from ITEM 1. The results support extremely strongly the proposition that the paint chips recovered from the street sign pole (ITEM 3) originate from an unknown yellow vehicle rather than that these traces originate from the suspect's vehicle. Based on visual observations with (stereo)microscopy and the analytical results from infrared spectroscopy, raman spectroscopy and SEM-EDX ITEM 2 cannot be distinguished from ITEM 1. The results support strongly the proposition that the paint chips recovered from the parked car in the parking lot (ITEM 2) originate from the suspect's vehicle rather than that these traces originate from an unknown yellow vehicle.
BPZXF2	Conclusions: When the Questioned Exhibit 2 (Item 2) was compared to the Known Exhibit 1 (Item 1) no conclusion could be drawn due to the infrared and elemental analysis instruments being out of service. When the Questioned Exhibit 3 (Item 3) was compared to the Known Exhibit 1 (Item 1) it was concluded that the questioned sample did not originate from the source represented by the Known sample.
D3CGLY	1. I have considered the following propositions to evaluate my findings: a. The paint chips recovered from the parked car and/or the street sign originated from the damaged area of the suspect's vehicle. b. The paint chips recovered from the parked car and/or the street sign originated from an unrelated source and are present due to chance. 2. Given the above, I consider the findings to be more probable if the first proposition is true in regards to the paints chips recovered from the parked car, that is, the paint chips recovered from the parked car originated from the damaged area of the suspect's vehicle rather than the second that the paint chips were present by chance. 3. Consequently, it is my opinion that the recovered paint chips from the street sign (Item 3) can be excluded from having originated from the damaged area of the suspect's vehicle based on differences observed in the analysis. The findings provide moderately strong support for the proposition that the paint chips recovered from the parked car (Item 2) originated from the damaged area of the suspect's vehicle (Item 1).
DPP82E	Difference in abundance of Titanium, Barium, Sodium, Potassium and slight difference in Calcium abundance confirmed that item 1 was not similar to Item 2 and Item 3. Hence the suspect's vehicle was most probably not involved in this road accident.
DYFQH9	On analysis, I found: i) Item 1: Known paint sample representative of the damaged area of the suspect's vehicle to be similar to Item 2 Questioned paint chips recovered from the parked car in the parking lot. ii) Item 1: Known paint sample representative of the damaged area of the suspect's vehicle to be dissimilar to Item 3 Questioned paint chips recovered from the street sign pole. Based on the findings, I am of the opinion that: i) Item 1: Known paint sample representative of the damaged area of the suspect's vehicle and Item 2 Questioned paint chips recovered from the parked car in the parking lot could have come from the same source. ii) Item 1: Known paint sample representative of the damaged area of the suspect's vehicle and Item 3 Questioned paint chips recovered from the street sign pole did not come from the same

TABLE 3

WebCode	Conclusions
	source.
DZVRMV	1. Comparative examinations of Exhibit 1 (item 1) with Exhibit 2 (item 2) disclosed them to be consistent in their physical characteristics, organic compositions, and elemental compositions. As a result of these findings, Exhibit 2 could have originated from Exhibit 1, or another source with the same characteristics. A paint association is not a means of positive identification and the number of possible sources for a specific paint is unknown. 2. Comparative examinations of Exhibit 1 (item 1) with Exhibit 3 (item 3) disclosed them to be inconsistent in their physical characteristics. As a result of these findings, Exhibit 3 could not have originated from Exhibit 1.
G6UFRT	The yellow paint from the parked car (Item 2) was found to be similar in color, layer sequence, and chemistry in comparison to the paint from the suspect's vehicle (Item 1). The paint from Item 2 could have come from the same source as Item 1, or from any other source of paint with similar color, layer sequence, and chemistry. The paint from the street sign pole (Item 3) was found to be different in layer sequence in comparison to the paint from the suspect's vehicle (Item 1). The paint from Item 3 could not have come from the same damaged area as the sample from Item 1. Items 1 and 2 were examined visually and using stereomicroscopy, Fourier Transformed Infrared Spectroscopy, and Scanning Electron Microscopy. Item 3 was examined visually and using stereomicroscopy. Samples collected and analyzed during the examination and analysis of the items in this case (low e- slide) have been returned to and retained with the original item.
GTWU6U	Item 2: The color, physical, chemical, and elemental characteristics of the questioned paint of Item #2 were consistent with the color, physical, chemical, and elemental characteristics of the known paint of Item #1. This is a Type III Association. Item 3: Significant differences were observed in the physical characteristics of the questioned paint of Item #3 and the physical characteristics of the known paint of Item #1. This is an Elimination.
H4HZXR	Comparative examinations of Exhibit 2 (questioned paint chips recovered from parked car in the parking lot) with the paint from Exhibit 1 (known paint sample representative of the damaged area of the suspect's vehicle) disclosed them to be consistent in their physical characteristics, organic compositions, and elemental compositions. Therefore, Exhibit 2 could have originated from Exhibit 1 or another source with the same characteristics. Comparative examinations of Exhibit 3 (questioned paint chips recovered from the street sign pole) with the paint from Exhibit 1 (known paint sample representative of the damaged area of the suspect's vehicle) disclosed them to be inconsistent in their physical characteristics. Therefore, Exhibit 3 could not have originated from Exhibit 1. It should be noted that a paint association is not a means of positive identification and the number of possible sources for a specific paint is unknown.
HBXY9W	The paint chips from the parked car (item 2) could have originated from the damaged area of the vehicle, as represented by the known submitted exemplar (item 1) or from another source with paint composed of similar chemical composition, color and layer system. The paint chips from the street sign pole (item 3) could not have originated from the damaged area of the vehicle as represented by the known submitted exemplar (item 1).
HR37MY	Questioned paint chips recovered from the parked car in the parking lot (item2) matched colour, layer structure and chemical composition with item1, known paint sample resrepresentative of the damaged area of the suspect's vehicle. Thus, the questioned paint chips in item 2 could have originated from the same source as the known paint sample in item1. Questioned paint chips in item 3 were inconsistent with known paint sample in item 1 and cannot thus originate from the same source as the paint sample in item 1.
J7XA4U	Examinations: Visual examination, stereomicroscopy, polarized light microscopy, fluorescence microscopy, infrared spectroscopy, microspectrophotometry, scanning electron microscopy -

TABLE 3

WebCode	Conclusions
	<p>energy dispersive spectroscopy Information: The known four-layer paint sample (Item 1) was submitted for comparison to questioned four-layer paint samples (Items 2 and 3). Items 1 and 2 had a paint layer sequence of clear/yellow/dark gray/dark gray. Item 3 had a paint layer sequence of clear/yellow/white/dark gray. Results: Item 3 differed in paint layer sequence from Item 1. The questioned paint reportedly recovered from a street sign pole did not originate from the source represented by the known paint sample in Item 1. Each layer of the sampled questioned paint in Item 2 corresponded to the respective layer of the sampled known paint in Item 1 in all tests performed. The questioned paint reportedly recovered from a parked car originated either from the vehicle as represented by Item 1 or from another paint source with indistinguishable properties. Because other vehicles or items may have been painted with paint that would also be indistinguishable from the submitted evidence, an individual source cannot be determined.</p>
JHRBYJ	<p>Based on FTIR analysis of the top layer of paint of all three items, neither Item 2 (parked car) or Item 3 (sign pole) could be excluded as having originated from Items 1 (suspect's vehicle). In addition, SEM and EDS analysis of all four layers in Items 1 and 2 did not detect any significant variations between them, therefore it was concluded that Item 2 (parked car) could have originated from Item 1 (suspect's vehicle). However, a comparison between SEM and EDS analysis results for Items 1 and 3 did reveal a difference in texture and elemental composition in the third layer down. Therefore, it was concluded that Item 3 (sign pole) could not have originated from Item 1 (suspect's car).</p>
JU4TET	<p>Macroscopic, microscopic, and instrumental (Micro-FTIR and SEM-EDS) analysis of the questioned paint recovered from the parked car, item #01.02, and the known paint recovered from the suspect's vehicle, item #01.01, revealed that they are consistent with respect to color, texture, layer structure, elemental composition, and chemical type. Therefore, the questioned paint recovered from the parked car, item #01.02, could have originated from the known source as represented by item #01.01 or another vehicular source, or painted surface, exhibiting the same characteristics (color, texture, layer structure, elemental composition, and chemical type). Macroscopic and microscopic analysis of the questioned paint recovered from the street sign pole, item #01.03, and the known paint recovered from the suspect's vehicle, item #01.01, revealed that they are dissimilar with respect to layer structure. Therefore, the questioned paint recovered from the street sign pole, item #01.03, could not have come from the known source as represented by item #01.01.</p>
JYYPXT	<p>Item 1 (known from suspect's vehicle) was 3-layer (clear/yellow/grey). Item 2 (foreign paint from parked vehicle) was 3-layer (clear/yellow/grey). Item 3 (foreign paint from pole) was 4-layer (clear/yellow/white/grey). Based on the layer structure and analyses conducted, Item 3 was eliminated as having from any association with Item 1. Based on the layer structure and analyses conducted, it is my opinion there is a level 2 association between Item 1 and Item 2. Another vehicle having the same paint and layer structure as Item 1 could also be a source of the paint of Item 2.</p>
K64LLY	<p>Item 1 and Item 2 were examined when they found to be similar in colour, cross sectional layer structure, chemical properties and compositions such that, in our opinion they could have had a common origin. In our opinion, this provides moderate support for the scenario that the suspect vehicle and the parked vehicle have had contact with each other. Item 3 was found to be different from Item 1. There is no evidence to support the scenario that the suspect vehicle has had contact with the street pole sign.</p>
KDXQEZ	<p>The trace material was viewed and compared under the stereomicroscope (Leica M 165FC) and the microscope (Leica DM4 M) at different magnifications and illuminations (incident light/fluorescence and polarization). The comparison between the trace material was carried out with regard to properties such as colour, surface structure and cross-sectional structure.</p>

TABLE 3

WebCode	Conclusions
	With the different lighting, item 2 and item 3 could not be distinguished from item 1. Only the examination of the cross-section showed that item 2 and item 1 are visually indistinguishable with the means at our disposal. The number of layers and the thickness of each layer match. Item 3 could be excluded due to an additional layer. Based on the above-mentioned findings, the secured traces from the damaged vehicle may originate from the offender's vehicle.
KFYU62	The paint from item-2 (questioned paint chips recovered from the parked car in the parking lot) and item-1 (known paint sample representative of the damaged area of suspect's vehicle) were consistent on color, layering and chemical composition and could have the same source. The paint from item-3 (questioned paint chips recovered from the street sign pole) and item-1 (known paint sample representative of the damaged area of suspect's vehicle) were inconsistent and could not have the same source.
L4NLZP	These exhibits were examined in an attempt to determine whether or not there is evidence of an association between the paint chips from the parked car and/or sign pole and the damaged area of the subject vehicle as represented by the standard. Item 1 consists of one (1) medium yellow paint chip having the following layer structure: 1. Clear colorless acrylic-melamine-styrene-urethane topcoat 2. Medium yellow acrylic-melamine-polyester-urethane finishcoat 3. Dark gray acrylic-melamine primer 4. Dark gray polyester-melamine primer This layer structure is consistent with an original automotive paint layer system. The paint chip in Item 1 was used as a standard representative of the subject vehicle for comparison purposes. Item 2 consists of two (2) medium yellow paint chips having the following layer structure: 1. Clear colorless acrylic-melamine-styrene-urethane topcoat 2. Medium yellow acrylic-melamine-polyester-urethane finishcoat 3. Dark gray acrylic-melamine primer 4. Dark gray polyester-melamine primer This layer structure is consistent with an original automotive paint layer system. Microscopical and instrumental examinations and comparisons between these paint chips and the standard from the subject vehicle in Item 1 revealed that they are like one another with respect to their layer colors, layer textures, and layer sequences, as well as the binder characteristics (including the detailed binder characteristics of Layers 1 and 2), pigment characteristics, and elemental characteristics of their respective layers. It is therefore concluded that the paint chips recovered from the parked car originated from the area of the subject vehicle represented by Item 1 or from another damaged source of automotive paint having the same characteristics. Item 3 consists of two (2) medium yellow paint chips having the following layer structure: 1. Clear colorless topcoat 2. Medium yellow finishcoat 3. Light gray primer 4. Dark gray primer These paint chips exhibit characteristics consistent with an automotive paint layer system. Comparative examinations between these paint chips and the standard from the subject vehicle in Item 1 revealed exclusionary differences with respect to the color of Layer 3. It is therefore concluded that the paint chips recovered from the sign pole did not originate from the damaged area of the subject vehicle as represented by the standard.
LFYBF7	The questioned paint chips recovered from the street sign pole (item 3) could have originated from the damaged area of the suspects vehicle (item1). The questioned paint chips recovered from the damaged area of the parked car in the parking lot (item2) did not originate from the damaged area of the suspects vehicle (item1).
PBR2VD	Item 2 could have originated from item 1.
PKGLHY	On analysis, I found that Item 2 are similar to Item 1. Hence, I am of the opinion that the questioned paint chips recovered from the parked car in the parking lot (Item 2) could have originated from the damaged area of the suspect's vehicle (Item 1).
PLUC9V	The paint chips from the damaged area of the parked car in the parking lot (Item 2) could have originated from the damaged area of the suspect's vehicle as represented by Item 1, based on examination by stereomicroscopy, FTIR, and SEM/EDS. The paint chips recovered from the

TABLE 3

WebCode	Conclusions
	street sign pole (Item 3) could not have originated from the damaged area of the suspect's car, as the Item 3 paint chips had 4 layers, while the item 1 paint chip had 3 layers.
PMNZQQ	The four-layer paint recovered from the parked car (item 2) matches the four-layer known paint from the suspect's vehicle (item 1) with respect to colour, layer sequence and chemical composition of the four paint layers. The four-layer paint recovered from the street sign pole (item 3) does not match the known paint from the suspect's vehicle (item 1) with respect to the layer sequence or the chemical composition of some of the layers.
PYXK7D	Physical and chemical examinations indicate that: Item 2 and 1 are indistinguishable from each other. Therefore, item 2 (questioned paint chips recovered from the packed car in the parking lot) could have originated from item 1 (known sample representative of the damaged area of the suspect's vehicle). Item 3 is different from item 1 with regard to physical properties and chemical composition. Therefore, item 3 (questioned paint chips recovered from the street sign pole) did not originate from item 1 (questioned paint chips recovered from the packed car in the parking lot).
Q2GZAD	The comparative microscopic observation and chemical analysis of the paint sample collected from the damaged area of the suspect's vehicle (Item 1) with the paint chips recovered from the parked car in the parking lot (Item 2) and the street sign pole (Item 3), reveal that: The paint in Item 1 and that in Item 2 show groupal similarities in color, number, succession and chemical composition of the film paint layers. The paint in Item 1 and that in Item 3 show differences in color, number and succession of the film paint layers.
Q4N9KH	The paint from the parked car in the parking lot (Item 2) is similar in visual color, microscopic characteristics, paint type and composition to known paint from the damaged area of the suspect vehicle (Item 1). It is my opinion that this paint could have originated from the damaged area of the suspect vehicle or any other source with similar characteristics. The paint from the street sign pole (Item 3) is dissimilar in paint layer sequence to the known paint from the damaged area of the suspect vehicle (Item 1). It is my opinion that this paint did not originate from the known paint from the damaged area of the suspect vehicle.
RL7V6X	Using our instrumental methods (FTIR, Raman) we did not observe difference in chemistry composition of 3 consecutive paint layers (transparent, yellow and grey) on metal pieces between Item 1 and Item 2. It is possible that Item 2 has origin in Item 1. Item 3 consist of 4 consecutive paint layers (transparent, yellow, white and grey) and differs from Item 1.
RQXXAX	Item 3 is different from control Item 1 In my opinion Item 2 is indistinguishable from Item 1. In my opinion these findings provide strong support for the view that Item 2 has originated from Item 1.
TW6LNK	Items 1, 2, and 3 were examined using stereomicroscopy. Items 1 and 2 were additionally examined using infra-red spectroscopy, microspectrophotometry, scanning electron microscopy/energy-dispersive x-ray spectrometry, and pyrolysis gas chromatography - mass spectrometry. Yellow paint in Item 2 was indistinguishable from yellow paint in Item 1 (Type 3 Association) in color, type, layer structure, texture, and elemental composition. This means that the questioned paint chips recovered from the parked car in the parking lot could have originated from the damaged area of the suspect's vehicle. Yellow paint in Item 3 was different from yellow paint in Item 1 (Elimination). This means that the questioned paint chips recovered from the street sign pole did not originate from the damaged area of the suspect's vehicle. Trace Interpretation Scale: Type 1 Association: Physical Match. 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

TABLE 3

WebCode	Conclusions
	<p>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.</p>
U7J3UV	<p>The questioned paint chips recovered from the parked car in the parking lot (Item 2) could have been originated from paint sample of the damaged area of the suspect's vehicle (Item 1), because of the similarities on their physical properties and chemical compositions. The questioned paint chips recovered from the street sign pole (Item 3) could NOT be originated from paint sample of the damaged area of the suspect's vehicle (Item 1), because of the differences on their physical properties and chemical compositions.</p>
UBYVKN	<p>The evidence give strong support to the hypothesis that Item 1 and Item 2 do originate from the same source held against the hypothesis that they originate from different sources. The evidence give extremely strong support to the hypothesis that Item 1 og Item 3 do not originate from the same source held against the hypothesis that they originate from the same source.</p>
UTE8BU	<p>Microscopic examination: Item 1 and 2 contain 3 layers, which is clear, yellow and grey coat (from top to bottom). Item 3 contains 4 layers (clear, yellow, white and grey coat). Item 2 and Item 1 are found to be consistent in color, layer sequence, microscopic appearance and instrumental analysis. However, Item 3 and Item 1 differ in the number of layers. Accordingly, Item 2 could have originated from Item 1, while Item 3 couldn't.</p>
V2MXFH	<p>Considering the morphology, number and color of layers, no significant differences were observed between Item 1 and Item 2. The analysis performed by FTIR and Raman spectroscopy determined that both samples are indistinguishable with the techniques used. Therefore, Item 1 and Item 2 could have the same origin. Considering the morphology, number and color of layers, significant differences were observed between Item 1 and Item 3. Additionally, the analysis performed by FTIR and Raman spectroscopy determined that both samples have different composition. According to these results, Item 1 and Item 3 have different origins.</p>
VU3ZMN	<p>The questioned paint chips recovered from the damaged area of the parked car in the parking lot (Item 2) could have originated from the damaged area of the suspect's vehicle as represented by Item 1. The questioned paint chips recovered from the street sign pole (Item 3) couldn't have originated from the damaged area of the suspect's vehicle as represented by Item 1.</p>
WFZQGU	<p>The paint chip recovered from the damaged car (item 2) is indistinguishable from the paint chip of the suspects' vehicle (item 1). Therefore, item 2 can originate from item 1. On the contrary,</p>

TABLE 3

WebCode	Conclusions
	item 3 is distinguishable from item 1 because of an additional white paint layer, which only occurs in item 3. Therefore, item 3 does not originate from item 1.
WJ2WUE	The results strongly support that the examined paint chips, in Item 2, originate from the damaged area of the suspects vehicle, from which Item 1 is collected (Level+3). The results of the examination extremely strongly support that the examined paint chips, in Item 3, does not originate from the damaged area of the suspects vehicle, from which Item 1 is collected (Level -4).
WJWJ94	<p>Results of Examinations: The Item 2 questioned paint chips recovered from the parked car in the parking lot and the Item 3 questioned paint chips recovered from the street sign pole were examined and compared to the Item 1 known paint representative of the damaged area of the suspect vehicle. Based on the examinations conducted, the four layers of paint comprising Item 2 could not be distinguished in sequence, color, texture, and chemical composition to the corresponding layers of paint in Item 1. Accordingly, Item 1 and Item 2 originated from the same vehicle or from different vehicles painted in the same manner (Type III Association – see Interpretation section). This type of association was reached because, while many vehicles have paint systems different than these, other vehicles produced at the same manufacturing plant as the source of Item 1, which were painted with the same color and paint formulations, would also be indistinguishable. Item 1 and Item 3 differed in layer structure. Therefore, Item 1 and Item 3 do not share a common source (Elimination). Interpretation: The following categories and their descriptions are meant to provide context to the conclusions reached in this report. Every category may not be applicable in every case nor for every material. Type I Association: Physical/Fracture Match: The items exhibit physical features that demonstrate they were once part of the same object. Associations of Evidence with Class Characteristics: Class characteristics are physical and/or chemical properties that place an item within a particular group of items. Associations of evidence with class characteristics can have varying degrees of significance. In general, the smaller the size of the group relative to the relevant population, the more significant the association. A class association cannot definitively establish that the items came from the same source. Type II: Association with Highly Discriminating Characteristics: An association in which items could not be differentiated. Therefore, the possibility that the items came from the same source cannot be eliminated. Additionally, the items share unusual characteristics that would not be expected to be encountered in the relevant population. Type III: Association with Discriminating Characteristics: An association in which items could not be differentiated. Therefore, the possibility that the items came from the same source cannot be eliminated. Other items have been manufactured that would also be indistinguishable from the submitted items and could be encountered in the relevant population. Type IV: Association with Limitations: An association in which items could not be differentiated. Therefore, the possibility that the items came from the same source cannot be eliminated. As compared to the categories above, this type of association has decreased evidential value. For example, the items are more commonly encountered in the relevant population, a complete analysis was not performed due to limited characteristics or a limited analytical scheme, or minor variations were observed in the data. Inconclusive: No conclusion could be reached. Elimination: The items exhibit exclusionary differences that demonstrate they did not originate from the same source.</p>
WQKZ2G	The suspect vehicle (as represented by item 1) could not be eliminated as a possible source of the paint recovered from the parked car (item 2). As such, the paint recovered from the parked car either came from the suspect vehicle or from another source of paint that is indistinguishable from the suspect vehicle with respect to the properties listed in the results. Other sources of indistinguishable paint would include other damaged vehicles of the same colour manufactured at the same assembly plant during the time this paint formulation was in use. The suspect vehicle (as represented by item 1) was eliminated as a possible source of the

TABLE 3

WebCode	Conclusions
	paint recovered from the street sign pole (item 3).
WXKEQN	<p>The content of the Item 1, Item 2 and Item 3 has been analyzed. The Item 1 content is a 1.5 cm squared multilayer paint chip from the suspect's vehicle. A careful observation with the stereomicroscope shows four layers organized as follow: a clear coat, a yellow basecoat above a grey primer surfacer, all applied on a grey first primer. The Item 2 contains two 0.5 cm squared multilayer paint chips recovered from the parked car in the parking lot. A careful observation with the stereomicroscope shows four layers organized as follow: a clear coat, a yellow basecoat above a grey primer surfacer, all applied on a grey first primer. The Item 3 content consists of two 0.5 cm squared multilayer paint chips recovered from the street sign pole lot. A careful observation with the stereomicroscope shows a clear coat, yellow basecoat above a white primer layer, laying on a grey first primer. Our observations under the stereomicroscope show that the content of Item 1 and 2 are different from the content of Item 3. The paint chip recovered from the street sign pole couldn't have originated from the suspect's vehicle. In addition, the 4 layers of Item 1 and Item 2 are visually indistinguishable from each other. The comparative analysis of the infrared absorption bands show that the infrared spectra of the Item 1 four layers are indistinguishable from the infrared spectra of the Item 2 four layers. According to our analytical method, we proceed to only one analytical technique as long as we compare four layers from the questioned sample to four layers from the reference sample, and the comparisons show indistinguishable results. Consequently, our observations and our analysis show that it is highly likely that the paint chip recovered from the parked car (Item 2) could have originated from the suspect's vehicle (Item 1).</p>
XMHGGU	<p>Microscopic examination revealed that Items 1 and 2 each contained three coating layers, while Item 3 contained four coating layers. FTIR analysis of the three layers obtained from Item 1 were compared to spectra obtained of Item 2 and were visually consistent. Therefore, based on these observations, it was concluded that Item 1 and Item 2 are the same, but Item 1 and Item 3 are not.</p>
ZYHWGF	<p>METHODS: Items 1, 2 and 3 were examined visually and using stereomicroscopy, compound microscopy and fluorescence microscopy. Items 1 and 2 were further examined using microchemical tests, Fourier Transform Infrared Spectrophotometry (FTIR), and Scanning Electron Microscopy-Energy Dispersive X-Ray Spectrometry (SEM-EDS). RESULTS AND CONCLUSIONS: The Item 2 multilayered yellow paint particles were consistent with the Item 1 multilayered yellow paint in colors, textures, types, layer sequence, and chemical compositions. Based on the particles examined, it was concluded that these Item 2 paint particles originated from either the paint source represented by Item 1 or another source of paint with the same colors, textures, types, layer sequences, and chemical compositions (Level III – Association with Discriminating Characteristics). This type of conclusion was reached because other vehicles produced at the same manufacturing plant and painted with the same type of paint system would also be indistinguishable. It should be noted that the techniques used in this comparative analysis can typically distinguish paint systems from different assembly plants. Based on the particles examined, the multilayered yellow paint particles in Items 1 and 3 could not be associated due to differences in layer sequence and fluorescence (Exclusion/Elimination). TERMINOLOGY KEY FOR COMPARATIVE EXAMINATIONS: Level I - Physical/Fracture Match: Physical Fit is reached when the items that have been broken, torn, or separated exhibit physical features that correspond/re-align in a manner that is not expected to be replicated. Level II - Association with Highly Discriminating Characteristics: An association in which items could not be differentiated based on the examinations conducted. Therefore, the possibility that the items came from the same source cannot be eliminated. Additionally, the items share unusual characteristics that would rarely be expected to occur in the relevant population. This is the highest degree of association that can be determined in the absence of a Physical Fit. Level III -</p>

TABLE 3

WebCode	Conclusions
	<p>Association with Discriminating Characteristics: An association in which items could not be differentiated based on the examinations conducted. Therefore, the possibility that the items came from the same source cannot be eliminated. Other items have been manufactured or could occur in nature that would also be indistinguishable from the submitted items and could be encountered in the relevant population. The analytical techniques used in the analysis of these items can provide high levels of discrimination among natural and manufactured materials. This is considered a high degree of association. Level IV - Association with Limitations: An association in which items could not be differentiated based on the examinations conducted. Therefore, the possibility that the items came from the same source cannot be eliminated. As compared to the categories above, this type of association has decreased evidential value. For example, the items are more commonly encountered in the relevant population, minor variations were observed, or a complete analysis was not performed due to limited characteristics or sample size. Minor variations, for certain types of examinations, could be due to factors such as contamination of the sample(s) or having a sample of insufficient size to adequately assess heterogeneity of the entity from which it was derived. Inconclusive: No conclusion could be reached regarding an association or an elimination between the items. Exclusion with Limitations: The item exhibits differences from the comparison sample that support that it did not originate from the source, as represented by the comparison sample. An Exclusion/Elimination conclusion was not reached due to limiting factors, such as possible natural or manufactured source variations. Exclusion/Elimination: The items exhibit differences that demonstrate the items did not originate from the same source.</p>

Additional Comments

TABLE 4

WebCode	Additional Comments
2C3YDD	During our investigations we noticed that three of the four layers that comprise item 3 match those in item 1. The conclusion with regards to item 3, as stated above, is based on the instruction that the obtained samples are representative. In practical casework, we would ask for additional samples from the suspect's car to validate whether the obtained known sample is truly representative.
3BCW8P	In our laboratory the majority of casework received consists of automobile paint transfer, it is common to receive different exhibits from a real case scenario to compare with a suspect car. Samples of fragments smaller than 0.5 cm and with refinish systems greater than 5 layers are received as typical cases.
4R7CKK	The difficulty in associating them with certainty lies in the fact that it is only possible to compare three layers of paint with common characteristics that are not very individualizing.
D3CGLY	Elemental analysis (micro-XRF) was not performed as this instrument was not fit for casework.
DPP82E	Item 1, Item 2 and Item3 were examined by using Elemental Composition Comparator (ECCO 2) through Laser Breakdown Spectroscopy (LIBS) for confirmation and Comparison Macroscope (Projectina) was used to screen the samples. Item 2 and Item 3 were similar.
HR37MY	The findings provide moderately strong support for the proposition that the paint chips in item2 originate from the same source as the paint sample in item1.
J7XA4U	An association scale would be included with the report.
JYYPXT	Levels of association range from Level 1 (highest) to Level 5 (lowest) as well as Inconclusive and Elimination.
KDXQEZ	The size of the trace material does not correspond to real cases
WFZQGU	The 3 layers (besides the additional white layer) of item 3 are indistinguishable from the layers of item 1.

-End of Report-
(Appendix may follow)

Test No. 22-5452: Paint Analysis

DATA MUST BE SUBMITTED BY **Nov. 21, 2022, 11:59 p.m.** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: NRL63J

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 drunk driving incident. Witnesses called the local police station and described a yellow sports car swerving out of a local bar parking lot. When police arrived, they found damage to a parked car in the parking lot and nearby street sign pole. Police were able to recover paint chips from the parked car and from the street sign pole. Later that day, police located a suspect vehicle that matches the witness descriptions and appears to have sustained damage to the front bumper. A questioned paint sample has been collected from the damaged area of the parked car and street sign pole. Police are requesting that you examine the recovered paint chips and determine if they could have originated from the damaged area of the suspect's vehicle.

Please Note:

- Samples contained within each individual item are representative of a single source.
- The purpose of this test is the examination of the paint; please ignore the metal substrate.

Items Submitted (Sample Pack P2):

- Item 1: Known paint sample representative of the damaged area of the suspect's vehicle.
- Item 2: Questioned paint chips recovered from the parked car in the parking lot.
- Item 3: Questioned paint chips recovered from the street sign pole.

1.) Could the questioned paint chips recovered from the damaged are of the parked car in the parking lot (Item 2) and/or from the street sign pole (Item 3) have originated from the damaged area of the suspect's vehicle as represented by 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.) Indicate the procedure(s) used to examine the submitted items:

Please check all that apply.

Microscopic Exams:	<input type="checkbox"/> Stereomicroscope	<input type="checkbox"/> Polarized Light
	<input type="checkbox"/> Fluorescence	
<input type="checkbox"/> Pyrolysis GC	<input type="checkbox"/> FTIR	<input type="checkbox"/> Solubility/Chemical
<input type="checkbox"/> XRS/XRF	<input type="checkbox"/> SEM/EDX	<input type="checkbox"/> Microspectrophotometry

Other (specify):

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

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

4.) Additional Comments

RELEASE OF DATA TO ACCREDITATION BODIES

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

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

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

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

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

ANAB Certificate No.
(Include ASCLD/LAB Certificate here)

A2LA Certificate No.

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

Authorized Contact Person and Title

Laboratory Name

Location (City/State)