



Tire Track Imprint Evidence Test No. 17-5351/5 Summary Report

Each sample pack contained either digitally produced photographs (17-5351) or directly downloadable digital images (17-5355) of four questioned tire track imprints, photographs of a suspect tire, and test imprints made with that tire. Participants were requested to compare the imprints from the crime scene with the suspect tire and report their findings. Data were returned by 40 participants: 30 for 17-5351 and 10 for 17-5355 and are compiled into the following tables:

	<u>Page</u>
<u>Manufacturer's Information</u>	<u>2</u>
<u>Summary Comments</u>	<u>3</u>
<u>Table 1: Examination Results</u>	<u>4</u>
<u>Table 2: Conclusions</u>	<u>11</u>
<u>Table 3: Additional Comments</u>	<u>17</u>
<u>Appendix: Data Sheet</u>	<u>19</u>

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 contained either photographs or digital images of a suspect tire, inked exemplars of a suspect tire, and questioned tire track imprints. The suspect tire was photographed in segments (K1-8), with the start and end of each segment indicated by a red line and assigned a letter (A-H). The inked exemplars were segmented and captured in the same manner. Two photographs contained images of four questioned tire track imprints (Q1-Q4). Participants were asked to compare the suspect tire and inked exemplars with the questioned imprints to determine if any associations or identifications could be established.

SAMPLE PREPARATION -

The previously driven tires used in production of the test were gently cleaned to remove any loose debris from the surface prior to inking.

KNOWN EXEMPLARS (K1-K8, K1_2-K8_2): Inked exemplar imprints were created by pushing a vehicle containing the suspect tire across an inked surface and then white paper. The suspect tire was removed from the vehicle and photographed in segments after known exemplars and questioned imprints were collected.

QUESTIONED IMPRINTS (Q1-Q4): Questioned imprints were created by pushing a vehicle containing the suspect or elimination tire across an inked surface and then the substrate. The substrate was repositioned and the process repeated as necessary to capture all tire track imprints in question.

VERIFICATION -

Laboratories that conducted the predistribution examination of the images associated imprints Q1, Q2, and Q3 with the suspect tire. They eliminated imprint Q4.

SAMPLE PACK ASSEMBLY -

Once sample preparation, verification, and final image production were complete, each photo set was placed into a pre-labeled sample pack envelope, sealed with evidence tape, and initialed with "CTS." Digital download media were provided in a zipped file uploaded to the CTS portal.

Imprint	Tire Brand	Tire Specs	DOT Info	Segment(s)
Q1	Sumitomo	225/50 R18 95W M&S	DOT R81N (LM5R912)	C-E
Q2	Sumitomo	225/50 R18 95W M&S	DOT R81N (LM5R912)	F-H
Q3	Sumitomo	225/50 R18 95W M&S	DOT R81N (LM5R912)	A-C
Q4	Sumitomo	225/50 R18 95W M&S	DOT R81N	N/A - Elimination

Summary Comments

This test was designed to allow participants to assess their proficiency with tire track imprint examination. Test material consisted of two photographs containing four questioned tire track imprints (Q1-Q4), photographs of the suspect (known) tire, divided into segments (K1-K8), and photographs of inked exemplar imprints made with the tire (K1_2-K8_2). Participants were requested to determine if any of the questioned imprints were made by the known tire, utilizing a seven-point conclusion scale. Three of these imprints (Q1, Q2, Q3) were made by the known tire. The remaining one imprint (Q4) was made by a different tire (Refer to the Manufacturer's Information for preparation details).

Of the 40 responding participants, 38 (95%) reported the associations and non-associations consistent with the conclusions consensus. For this tabulation, all responses of association (A-D) with the expected tire segments were tallied together, and all responses of non-association (F-G) were tallied together. Of the 40 responding participants, 37 (93%) reported the segment(s) associated with the known tire as expected per the consensus. For imprints Q1, Q2, and Q3, up to two adjacent tire segments were anticipated to be reported as the source of each questioned imprint. All participants who reported only a part of or both associated segments are considered consistent with the segment consensus.

Three participants identified the known tire as the source of questioned imprints (Q1, Q2, Q3), but attributed the association to a segment or segments that were not within the consensus. One of these three participants reported a hyphen for the Item Q4 conclusion. One participant provided a response of Inconclusive regarding Item Q2. Three participants noted the entire tire's segments (A-H) with their exclusion of imprint Q4, which was not a requirement.

Several participants observed that there appeared to be a "ghosting" of a second tire tread within the inked exemplars provided for the known tire. This was researched and found to be an unintended artifact of test production. This occurrence does not appear to have affected the ability of participants to complete the test; nonetheless CTS has taken quality measures to prevent this type of incident in future test productions.

Examination Results

Indicate the results of your comparisons of the suspect tire with the questioned imprints.

TABLE 1a (Parking Sign)

Questioned Imprints					
WebCode-Test	Conclusion	<u>Q1</u> Segment(s)	Conclusion	<u>Q2</u> Segment(s)	Conclusion
2FRYWY-5355	A	C-D	A	F-H	
2QN8F2-5351	A	C-D	E		
4FH2EY-5351	A	C-E	C	F-H	
6GT4ZX-5351	A	C-D	A	F-G	
6KQXL6-5355	A	C-E	A	F-H	
6RZCXB-5351	A	C-E	B	F-H	
6VT6DY-5351	A	C-D	A	F-G	
6XD6J7-5355	A	C-E	A	F-H	
99MGPZ-5351	A	C-E	A	F-H	
9M8YG4-5355	A	C-E	A	F-H	
9PXEQT-5351	A	C-D	A	G-H	
A4U2DX-5351	A	C-D	A	F-H	
A87XUT-5351	A	C-E	A	F-H	
AU2Q33-5351	A	C-D	A	F-H	
AUGY4Q-5351	A	C-E	A	F-H	
B7TLXQ-5351	A	C-E	B	F-H	

TABLE 1a (Parking Sign)

Questioned Imprints					
WebCode- Test	Conclusion	<u>Q1</u>	Segment(s)	Conclusion	<u>Q2</u>
					Segment(s)
BG9NYZ- 5351	A		C-E	A	F-H
D4FVFH- 5351	C		F-G	D	H-A
DR4GKW- 5355	A		C-E	A	F-H
G7PABE- 5351	A		C-D	D	G-H
G9GY7T- 5351	A		C-E	C	E-G
JFLUQC- 5355	A		C-E	A	F-H
LU6AUM- 5355	A		C-E	A	F-H
MQDJZ9- 5351	C		D-E	B	C-E
NA9CQF- 5351	A		C-D	A	F-G
NPJ7ZM- 5351	A		C-E	A	F-H
P3KCFD- 5355	B		C-D	D	G-H
P4J6NJ- 5351	A		C-E	A	F-H
QYZRXF- 5351	A		C-D	B	G-H
RKFCVG- 5355	A		C-E	A	F-H
U6UPBA- 5351	A		C-E	A	F-H
U8FUJ8- 5351	A		C-E	A	F-H
VCMHW9- 5351	A		C-E	A	F-H

TABLE 1a (Parking Sign)

Questioned Imprints					
WebCode- Test	<u>Q1</u>		<u>Q2</u>		
	Conclusion	Segment(s)	Conclusion	Segment(s)	Segment(s)
VHCZD6- 5355	A	C-E	A	F-H	
W64P9F- 5351	B	C-D	B	F-G	
WDBCQJ- 5351	A	C-E	A	F-H	
XBBBWC- 5351	A	C-D	A	F-G	
Z7PGLV- 5351	A	C-E	A	F-H	
ZBMR6B- 5351	A	C-E	A	F-H	
ZRPTH9- 5351	A	C-E	A	F-H	

Response Summary				Participants: 40			
Q1 Conclusion		Segment(s), by frequency		Q2 Conclusion		Segment(s), by frequency	
Identification (A)	36 (90.0%)	C-E	25 (62.5%)	Identification (A)	29 (72.5%)	F-H	27 (67.5%)
High Degree of Ass'n. (B)	2 (5.0%)	C-D	13 (32.5%)	High Degree of Ass'n. (B)	5 (12.5%)	F-G	5 (12.5%)
Association (C)	2 (5.0%)	D-E	1 (2.5%)	Association (C)	2 (5.0%)	G-H	4 (10.0%)
Limited Ass'n. (D)	0 (0.0%)	F-G	1 (2.5%)	Limited Ass'n. (D)	3 (7.5%)	C-E	1 (2.5%)
Inconclusive (E)	0 (0.0%)			Inconclusive (E)	1 (2.5%)	E-G	1 (2.5%)
Non-Ass'n. (F)	0 (0.0%)			Non-Ass'n. (F)	0 (0.0%)	H-A	1 (2.5%)
Exclusion (G)	0 (0.0%)			Exclusion (G)	0 (0.0%)		

Examination Results

Indicate the results of your comparisons of the suspect tire with the questioned imprints.

TABLE 1b (Cardboard Box)

Questioned Imprints						
WebCode- Test	Q3			Q4		
	Conclusion	Segment(s)		Conclusion	Segment(s)	
2FRYWY- 5355	A	B-C		G		
2QN8F2- 5351	A	B-C		G		
4FH2EY- 5351	A	B-C		G		
6GT4ZX- 5351	A	A-B		G		
6KQXL6- 5355	A	A-C		G		
6RZCXB- 5351	A	A-C		G		
6VT6DY- 5351	A	A-B		G		
6XD6J7- 5355	A	A-C		G		
99MGPZ- 5351	A	A-C		G		
9M8YG4- 5355	A	A-C		G		
9PXEQT- 5351	A	B-C		G		
A4U2DX- 5351	A	B-C		G		
A87XUT- 5351	A	A-C		F		
AU2Q33- 5351	A	B-C		G		
AUGY4Q- 5351	A	A-C		G		
B7TLXQ- 5351	A	A-C		G		

TABLE 1b (Cardboard Box)

Questioned Imprints						
WebCode-Test	Q3			Q4		
	Conclusion	Segment(s)		Conclusion	Segment(s)	
BG9NYZ-5351	A	A-C		G		
D4FVFH-5351	C	B-C		G		
DR4GKW-5355	A	B-C		G	A-H	
G7PABE-5351	A	B-C		G		
G9GY7T-5351	A	A-C		G		
JFLUQC-5355	A	A-C		G		
LU6AUM-5355	A	A-C		G		
MQDJZ9-5351	A	B-C		-		
NA9CQF-5351	A	A-B		G		
NPJ7ZM-5351	A	A-C		G		
P3KCFD-5355	B	B-C		F		
P4J6NJ-5351	A	A-C		G		
QYZRXF-5351	A	B-C		G		
RKFCVG-5355	A	A-C		G		
U6UPBA-5351	A	A-C		F		
U8FUJ8-5351	A	A-C		G	A-H	
VCMHW9-5351	A	A-C		G		

TABLE 1b (Cardboard Box)

Questioned Imprints						
WebCode-Test	Q3			Q4		
	Conclusion	Segment(s)		Conclusion	Segment(s)	
VHCZD6-5355	A	A-C		G		
W64P9F-5351	A	A-B		G		
WDBCQJ-5351	A	B-C		G	A-H	
XBBBWC-5351	A	A-B		G		
Z7PGLV-5351	A	A-C		G		
ZBMR6B-5351	A	A-C		F		
ZRPTH9-5351	A	A-C		G		

Response Summary				Participants: 40			
Q3 Conclusion		Segment(s), by frequency		Q4 Conclusion		Segment(s), by frequency	
Identification (A)	38 (95.0%)	A-C	22 (55.0%)	Identification (A)	0 (0.0%)	None	37 (92.5%)
High Degree of Ass'n. (B)	1 (2.5%)	B-C	13 (32.5%)	High Degree of Ass'n. (B)	0 (0.0%)	A-H	3 (7.5%)
Association (C)	1 (2.5%)	A-B	5 (12.5%)	Association (C)	0 (0.0%)		
Limited Ass'n. (D)	0 (0.0%)			Limited Ass'n. (D)	0 (0.0%)		
Inconclusive (E)	0 (0.0%)			Inconclusive (E)	0 (0.0%)		
Non-Ass'n. (F)	0 (0.0%)			Non-Ass'n. (F)	4 (10.0%)		
Exclusion (G)	0 (0.0%)			Exclusion (G)	35 (87.5%)		

Examination Results

TABLE 1c - Complete Results

Response Summary				Participants: 40			
Q1 Conclusion		Segment(s), by frequency		Q2 Conclusion		Segment(s), by frequency	
Identification (A)	36 (90.0%)	C-E	25 (62.5%)	Identification (A)	29 (72.5%)	F-H	27 (67.5%)
High Degree of Ass'n. (B)	2 (5.0%)	C-D	13 (32.5%)	High Degree of Ass'n. (B)	5 (12.5%)	F-G	5 (12.5%)
Association (C)	2 (5.0%)	D-E	1 (2.5%)	Association (C)	2 (5.0%)	G-H	4 (10.0%)
Limited Ass'n. (D)	0 (0.0%)	F-G	1 (2.5%)	Limited Ass'n. (D)	3 (7.5%)	C-E	1 (2.5%)
Inconclusive (E)	0 (0.0%)			Inconclusive (E)	1 (2.5%)	E-G	1 (2.5%)
Non-Ass'n. (F)	0 (0.0%)			Non-Ass'n. (F)	0 (0.0%)	H-A	1 (2.5%)
Exclusion (G)	0 (0.0%)			Exclusion (G)	0 (0.0%)		
Q3 Conclusion		Segment(s), by frequency		Q4 Conclusion		Segment(s), by frequency	
Identification (A)	38 (95.0%)	A-C	22 (55.0%)	Identification (A)	0 (0.0%)	None	37 (92.5%)
High Degree of Ass'n. (B)	1 (2.5%)	B-C	13 (32.5%)	High Degree of Ass'n. (B)	0 (0.0%)	A-H	3 (7.5%)
Association (C)	1 (2.5%)	A-B	5 (12.5%)	Association (C)	0 (0.0%)		
Limited Ass'n. (D)	0 (0.0%)			Limited Ass'n. (D)	0 (0.0%)		
Inconclusive (E)	0 (0.0%)			Inconclusive (E)	0 (0.0%)		
Non-Ass'n. (F)	0 (0.0%)			Non-Ass'n. (F)	4 (10.0%)		
Exclusion (G)	0 (0.0%)			Exclusion (G)	35 (87.5%)		

Conclusions

TABLE 2

WebCode-Test	Conclusions
2FRYWY-5355	<p>The two digital photographs (Exhibits Q1- Q2 & Q3 - Q4) contain four tire impressions. The two digital photographs containing the tire impressions (Exhibits Q1 - Q2 & Q3 - Q4) and the reference tire photographs and the tire impression photographs (Exhibits K1 and K1a-h) were printed 1:1, were visually examined, and were determined to have partial tire impressions suitable for comparison. The four tire impressions (Exhibits Q1 - Q4) were determined to bear the same class characteristics as the reference tire impressions (Exhibit K1a - h); therefore, a more detailed visual comparison was done on each of the impressions (Exhibits Q1 - Q4) which yielded the following results: The tire impression (Exhibit Q1) bears the same tread design and multiple defects which were observed on corresponding areas of the tread pattern on the reference tire impression (Exhibit K1c); therefore, the tire impression (Exhibit Q1) was IDENTIFIED as having been made by the known tire (Exhibit K1). The tire impression (Exhibit Q2) bears the same tread design and multiple defects which were observed on corresponding areas of the tread pattern on the reference tire impressions (Exhibit K1f & g); therefore, the tire impression (Exhibit Q2) was IDENTIFIED as having been made by the known tire (Exhibit K1). The tire impression (Exhibit Q3) bears the same tread design and multiple defects which were observed on corresponding areas of the tread pattern on the reference tire impression (Exhibit K1b); therefore, the tire impression (Exhibit Q3) was IDENTIFIED as having been made by the known tire (Exhibit K1). The tire impression (Exhibit Q4) bears the same tread design as the known tire (Exhibit K1); however, the known tire impressions (Exhibit K1a - h) have one edge that is worn smooth. The tread pattern on the corresponding area of the tire impression (Exhibit Q4) does not have similar wear; therefore, the tire impression (Exhibit Q4) can be ELIMINATED as having been made by the known tire (Exhibit K1).</p>
2QN8F2-5351	<p>In section C-D can be found the individual characteristics for document Q1. In section B-C can be found th individual characteristics for document Q3. Individual characteristics for document Q4 could not be found in sections A-B through H-A.</p>
4FH2EY-5351	<p>Q1 - Questioned imprint found on a 'No Parking' sign and Q3 - Questioned imprint found on a cardboard box both had a common origin with the known imprints (K1-K8) made with the recovered tire. Q2 - Questioned imprint found on a 'No Parking' sign may have had a common origin with the known imprints (K1-K8) made with the recovered tire. Q4 - Questioned imprint found on the cardboard box did not have a common origin with the known imprints (K1-K8) made with the recovered tire.</p>
6GT4ZX-5351	<p>Conclusions: In my opinion, my findings show conclusively that the tyre impressions, labelled Q1 and Q2 (present on the road sign) and Q3 (present on the piece of cardboard) have all been made by the tyre taken from the vehicle in question. In my opinion, my findings show conclusively that the tyre impression, labelled Q4 (present on the piece of cardboard) has not been made by the tyre taken from the vehicle in question.</p>
6KQXL6-5355	<p>The questioned tire track imprints Q1, Q2 and Q3 are associated with the recovered tire. The questioned imprint Q1 shares agreement of class characteristics and randomly acquired characteristics of sufficient quality and quantity with the recovered tire (Sumitomo 225/50 R18) and the known imprints (K3_2 - segment C-D and K4_2 - segment D-E), which were made with the tire. The questioned imprint Q2 shares agreement of class characteristics and randomly acquired characteristics of sufficient quality and quantity with the recovered tire (Sumitomo 225/50 R18) and the known imprints (K6_2 - segment F-G and K7_2 - segment G-H), which were made with the tire. The questioned imprint Q3 shares agreement of class characteristics and randomly acquired characteristics of sufficient quality and quantity with the recovered tire (Sumitomo 225/50 R18) and the known imprints (K1_2 - segment A-B and K2_2 - segment B-C), which were made with the tire. The recovered tire (Sumitomo 225/50 R18) was the source of, and made, the questioned imprints Q1, Q2 and Q3. Another item of tire being the source of the imprints is considered a practical impossibility. Sufficient differences were noted in the comparison of class characteristics between the questioned tire track imprint Q4 and the known</p>

TABLE 2

WebCode-Test	Conclusions
	imprints (Item K1_2, ...K8_2, all segments) of the recovered tire (Sumitomo 225/50 R18). The recovered tire was not the source of, and did not make, the questioned imprint Q4.
6RZCXB-5351	Q1 and Q3 were identified as having the highest degree of association with the known items. Q1 shared an agreement of class and randomly acquired characteristics of sufficient quality and quantity between C and E of the known items and Q3 corresponded to segment between A and C. Q2 had corresponding class characteristics as well as unusual wear between F and H. Q4 was excluded as it had some dissimilarities with all the known item exhibits.
6VT6DY-5351	The tire from which the images (Items K1 thru K8) and inked imprints (Item K1_2 thru K8_2) were obtained is identified as having made the imprints depicted in Item Q1, Q2, and Q3 based on an agreement of class characteristics (tread design and size), wear, and randomly acquired characteristics of sufficient quality and quantity. The tire from which the images (Items K1 thru K8) and inked imprints (Item K1_2 thru K8_2) were obtained is excluded as having made the imprint depicted in item Q4 based on significant differences in observed wear.
6XD6J7-5355	The questioned impressions Q1, Q2, and Q3 correspond with the known tire photographed in this case file in overall size, tread design, wear, and a significant number of randomly acquired characteristics. Q1, Q2, and Q3 were all made by the known tire photographed in this case. The questioned impression, Q4, showed significantly different wear than the known tire photographed in this case. Q4 was not made by the known tire.
99MGPZ-5351	Questioned impressions Q1, Q2, and Q3 were made by the recovered Sumitomo 225/50 R18 95W tire. Questioned impression Q4 was not made by the recovered Sumitomo tire, based on differences in class characteristics. Possible suspect tires include Sumitomo tires; however, any suspect tire should be submitted to the laboratory for examination.
9M8YG4-5355	Q1 was made by K3 and K4, segments C through E. There is agreement in design, physical size, including noise treatment sequence, wear and several areas of randomly acquired characteristics. Q2 was made by K6 and K7, segments F through H. There is agreement in design, physical size, including noise treatment sequence and several areas of randomly acquired characteristics. Q3 was made by K1 and K2, segments A through C. There is agreement in design, physical size, including noise treatment sequence and several areas of randomly acquired characteristics. Q4 was excluded from K1 through K8. Although the pattern is similar, the outside rib has significant wear differences from any of the submitted known tire segments.
9PXEQT-5351	One (1) tire impression noted in Exhibit Q1 – Q2 (Q1) was made by the tire represented in Exhibits K1 through K8 and K1_2 through K8_2 based on design, physical size, wear, noise treatment and randomly acquired characteristics. One (1) tire impression noted in Exhibit Q1 – Q2 (Q2) was made by the tire represented in Exhibits K1 through K8 and K1_2 through K8_2 based on design, physical size, wear, noise treatment and randomly acquired characteristics. One (1) tire impression noted in Exhibit Q3 – Q4 (Q3) was made by the tire represented in Exhibits K1 through K8 and K1_2 through K8_2 based on design, physical size, wear, noise treatment and randomly acquired characteristics. The remaining tire impression noted in Exhibit Q3 – Q4 (Q4) was not made by the tire represented in Exhibits K1 through K8 and K1_2 through K8_2 based on differences in wear.
A4U2DX-5351	Q1 through Q3 were made by the submitted Sumitomo tire. Q4 was not made by the submitted Sumitomo tire. Q4 was made by a tire with a similar tread design as the submitted tire.
A87XUT-5351	The imprints Q1, Q2, and Q3 correspond with the imprints of the recovered tire in the mentioned sections in design size and general wear. There are also corresponding randomly acquired characteristics (damages, stones). The quality and quantity of these agreements is sufficient to identify the recovered tire as the one that caused imprints Q1, Q2, and Q3. The imprint Q4 shows a similar design but a different degree of wear as the recovered tire.

TABLE 2

WebCode-Test	Conclusions
AU2Q33-5351	The partial, questioned tire track impression, Q1, was made by the known tire in Submission K, Segments C - D. The partial, questioned tire track impression, Q2, was made by the known tire in Submission K, Segments F - H. The partial, questioned tire track impression, Q3, was made by the known tire in Submission K, Segments B - C. The partial, questioned tire track impression, Q4, was not made by the known tire in Submission K.
AUGY4Q-5351	The questioned impressions labelled Q1 and Q2 on a "No Parking" sign and Q3 and Q4 on a cardboard box were compared with known impressions (K1_2 through K8_2) of a Sumitomo brand tire from the suspect vehicle. Q1 was a partial impression of a tire tread with the same tread design as seen in the known impressions. The noise treatment corresponded to a portion of the tire tread and no significant difference in wear was observed. There was correspondence of randomly acquired characteristics that were of sufficient quantity and quality to conclude that the tire from the suspect vehicle had made the impression. Q2 was a partial impression of a tire tread that was partially across impression Q1 and at an angle to it. It had the same tread design as seen in the known impressions. The noise treatment corresponded to a portion of the tire tread and no significant difference in wear was observed. There was correspondence of randomly acquired characteristics that were of sufficient quantity and quality to conclude that the tire from the suspect vehicle had made the impression. Q3 was a partial impression of a tire tread with the same tread design as seen in the known impressions. The noise treatment corresponded to a portion of the tire tread and no significant difference in wear was observed. There was a correspondence of randomly acquired characteristics that were of sufficient quantity and quality to conclude that the tire from the suspect vehicle had made the impression. Q4 was a partial impression of a tire tread with the same tread design as seen in the known impressions. However the tire that made the impression was significantly less worn than the tire from the suspect vehicle indicating the suspect tire did not make the impression.
B7TLXQ-5351	The comparison between Q4 and recovered tires - their imprints, exhibits sufficient differences of class and randomly acquired characteristics. The comparison between Q1 and recovered tires - their imprints, exhibits sufficient agreement of class and randomly acquired characteristics. Clear identification has been made. The comparison between Q3 and recovered tires - their imprints, exhibits sufficient agreement of class and randomly acquired characteristics. Clear identification has been made. Q2 and recovered tires - their imprints, exhibits correspondence of class characteristics, in addition to unusual wear and some randomly acquired characteristics. A part of Q1 and some parking writings make some individual characteristics of Q2 can not be seen. So for Q2, high degree of association is chosen.
BG9NYZ-5351	There were similarities in tread design, tread block dimension and spacing, wear, and randomly acquired characteristics between impression Q1 and known tire segments C-E; therefore, the known tire made the questioned impression. There were similarities in tread design, tread block dimension and spacing, wear, and randomly acquired characteristics between impression Q2 and known tire segments F-H; therefore, the known tire made the questioned impression. There were similarities in tread design, tread block dimension and spacing, wear, and randomly acquired characteristics between impression Q3 and known tire segments A-C; therefore, the known tire made the questioned impression. Questioned impression Q4 had a similar tread design to the known tire; however, there were dissimilarities in the wear seen in the questioned impression. Q4 also had randomly acquired characteristics that were not present in any of the known tire segments. Therefore, the known tire did not make the questioned impression.
D4FVFH-5351	The incoming items are similar in shape and patterns and contains a unique symbols, except part (Q4) it shows different in shape.
DR4GKW-5355	[No Conclusions Reported.]
G7PABE-5351	The known tire, K, was used to make reference imprints K1_2-K8_2. The reference imprints were compared to the questioned imprints from the crime scene. The comparison resulted in the following conclusions: The known tire was the source of, and made, the questioned impressions

TABLE 2

WebCode-Test	Conclusions
	Q1 and Q3. Some similar class characteristics between the known tire and the questioned impression, Q2, are observed with limiting factors. The known tire was not the source of, and did not make, the questioned impression Q4.
G9GY7T-5351	Q1 and Q2 share a similar tread design, size, wear, and accidental characteristics to the known tire. These impressions were made by this tire. Q2 shares a similar tread design and size to the known tire but, no identifying wear or accidental characteristics were visible. This impression could have been made by this tire or any other tire with a similar tread design and size. Q4 shares a similar tread design and size to the known tire but, has a different wear pattern. This impression could not have been made by this tire.
JFLUQC-5355	Tire track imprints Q1 - Q3 are left by given tire. Q1 is left by segment C-E, Q2 is left by segment F-H and Q3 is left by segment A-C. Tire track imprint Q4 is left by another tire.
LU6AUM-5355	The results indicated that the questioned tyre prints Q1-Q3 were made by the recovered tyre whereas the questioned tyre print Q4 was not made by the recovered tyre.
MQDJZ9-5351	Compare the imprints recovered at the scene with photographs of the tire and imprints made with the tire reveal that: 1- The imprints indicated in items Q1, Q2 and Q3 has same size and shape. 2- The imprints in item Q1 has the same imprints in segments CD-DE. 3- The imprints in item Q2 has the same imprints in segments BC-DE. 4- The imprints in item Q3 has the same imprints in segments AB-BC. 5- The imprints in item Q4 has a different shape
NA9CQF-5351	I conducted a comparative examination between the photos of the recovered tyre (K1-K8) and the test made impressions (K1-2 to K8-2), to the questioned imprints (Q1, Q2, Q3 and Q4). From my assessment of the quality and quantity of randomly acquired characteristics present, I formed the following opinions: The Q1, Q2 and Q3 impressions were made by the recovered tyre. The Q4 impression was not made by the recovered tyre.
NPJ7ZM-5351	Q1 was made by the known tire as depicted by segments C-D and D-E. Q2 was made the known tire as depicted by segments F-G and G-H. Q3 was made the known tire as depicted by segments A-B and B-C. Q4 could not have been made by the known tire.
P3KCFD-5355	Regarding Q1 and Q3, according to our method, we should consider a 3D tyreprint to take in consideration its general wear in order to answer "A". In this case, we are asked to consider a 2D tyreprint, and as consequence, we answered "B" as far as the defaults, the tyres sizes and the tyres types are the same. Regarding Q2, our answer was "D" because, according to us, the tyre type is the same than the reference tyre. But due to the poor quality of the imprint, and despite the fact we noticed two caracteric defaults, we are not able to determine the tyre size. Regarding Q4, we determined that this is the same brand, same type and same size but a different general wear than the reference tyre. So, this tyre may equipe the same vehicle than the reference tyre but is clearly different from it. As a consequence we answered "F".
P4J6NJ-5351	Items Q1, Q2 and Q3, photographs of questioned tire impressions were made by the Known Tire depicted in photographs K1-->K8 based on similarity of tread pattern design, overall size, wear characteristics and individual characteristics. Item Q4 can be excluded as having been made by the Known tire based on dissimilar wear characteristics.
QYZRXF-5351	1) Impression Q1 was made by the submitted Sumitomo tire (K3_2, Segment C-D). 2) Impression Q3 was made by the submitted Sumitomo tire (K2_2, Segment B-C). 3) Impression Q2 could have been made by the submitted Sumitomo tire based on class and some individual characteristics; however, insufficient detail precludes a more conclusive determination. (K7_2, Segment G-H). 4) Impression Q4 was not made by the submitted Sumitomo tire based on differences in wear characteristics.
RKFCVG-5355	Q1, Q2 and Q3 were made by the known tire. There were sufficient randomly acquired defects, tread wear and noise treatment identify to the known. Q4 was not made by the known tire. There were sufficient differences in randomly acquired defects and wear to eliminate.

TABLE 2

WebCode-Test	Conclusions
U6UPBA-5351	The partial tire track impressions visible on the "No Parking" sign in Exhibits #Q1 and #Q2 and on the cardboard box in Exhibit #Q3 were identified as having been made by the tire in Exhibit #K1. The partial tire track impression visible on the cardboard box in Exhibit #Q4 appears to exhibit some dissimilarity with the tread of the tire in Exhibit #K1; however, certain details or features are not sufficiently clear to permit elimination.
U8FUJ8-5351	In our opinion, the recovered tyre is responsible for the marks "Q1", "Q2" and "Q3". The recovered tyre is not responsible for the mark "Q4".
VCMHW9-5351	Item # Description Findings Comparison Conclusions #3 Questioned Tire impression (Q1) Same tread design, tread size, and matching individual characteristics as the known tire (Items #1 & #2) These findings confirm that this questioned impression was made exclusively by this known tire. Questioned Tire impression (Q2) Same tread design, tread size, and matching individual characteristics as the known tire (Items #1 & #2) These findings confirm that this questioned impression was made exclusively by this known tire. #4 Questioned Tire impression (Q3) Same tread design, tread size, and matching individual characteristics as the known tire (Items #1 & #2) These findings confirm that this questioned impression was made exclusively by this known tire. Questioned Tire impression (Q4) Different tread design from the known tire (Items #1 & #2) ELIMINATION Remarks: The evidence is being returned to your department for retention. Analytical Detail The findings were determined using visual examination and overlay techniques. [Participant submitted data in a format that could not be reproduced in this report].
VHCZD6-5355	Q1 and segment C-E of the known tire share agreement of class and randomly acquired characteristics. Q1 was made by the known tire, segment C-E. Q2 and segment F-H of the known tire share agreement of class and randomly acquired characteristics. Q2 was made by the known tire, segment F-H. Q3 and segment A-C of the known tire share agreement of class and randomly acquired characteristics. Q3 was made by the known tire, segment A-C. Q4 and the known tire exhibit sufficient differences of class, wear, and randomly acquired characteristics. The known tire is excluded as the source of Q4.
W64P9F-5351	Items Q1-4 were compared visually with Items K1-8 and K1_2 through K8_2. It is the opinion of this Examiner that Item Q3 is an Identification and was made by the suspect tire; Items Q1 and Q2 have a High Degree of Association and could have been made by the suspect tire; and Item 4 is an Exclusion and was not made by the suspect tire.
WDBCQJ-5351	It was determined that the impressions, Q-1, Q-2 and Q-3, were made by the submitted tire, K-1. It was also determined that the impression, Q-4, was not made by the submitted tire, K-1.
XBBCWC-5351	Q1 thru Q3 were identified as being made by K1, to the exclusion of all other tires. This conclusion was based on randomly acquired characteristics in both the questioned impressions and the standards of the known tire. Q4 was grossly dissimilar in characteristics and is excluded from being made by K1.
Z7PGLV-5351	[No Conclusions Reported.]
ZBMR6B-5351	Impressions Q1-Q3 are similar in tread design, dimension (including pitch sequence-the variation of the size, shape and arrangement of the tread elements around the circumference of a tire), wear and randomly acquired characteristics to the known tire. Consequently, the known tire made impressions Q1-Q3. Impression Q4 is similar in tread design, dimension (including pitch sequence-the variation of the size, shape and arrangement of the tread elements around the circumference of a tire) to the known tire. However, the wear is significantly different between impression Q4 and the known tire. The amount of time that has elapsed since the crime occurred and when the tire was collected, one day, and that the tire was collected only 18 miles from the crime scene cannot account for the significant wear differences between the known tire and impression Q4. Consequently, the known tire did not make the impression, Q4.

TABLE 2

WebCode-Test	Conclusions
ZRPTH9-5351	<p>The Questioned tire imprint Q1 on Item 001-1 of Submission 001 corresponds in tread design, wear characteristics and randomly acquired characteristics with the Known tire K1 (segments C-D and D-E) on Items 001-5, 001-6, 001-13 and 001-14 of Submission 001. It is the opinion of the undersigned examiners that the Questioned tire imprint Q1, was made by the Known tire K1 (segments C-D and D-E). The Questioned tire imprint Q2 on Item 001-1 of Submission 001 corresponds in tread design, wear characteristics and randomly acquired characteristics with the Known tire K1 (segments F-G and G-H) on Items 001-8, 001-9, 001-16 and 001-17 of Submission 001. It is the opinion of the undersigned examiners that the Questioned tire imprint Q2, was made by the Known tire K1 (segments F-G and G-H). The Questioned tire imprint Q3 on Item 001-2 of Submission 001 corresponds in tread design, wear characteristics and randomly acquired characteristics with the Known tire K1 (segments A-B and B-C) on Items 001-3, 001-4, 001-11 and 001-12 of Submission 001. It is the opinion of the undersigned examiners that the Questioned tire imprint Q3, was made by the Known tire K1 (segments A-B and B-C). The Questioned tire imprint Q4 on item 001-2 of Submission 001 does not correspond in wear characteristics with the Known tire K1 in Items 001-3 through 001-18. It is the opinion of the undersigned examiners that the Questioned tire imprint Q4 was not made by the Known tire K1.</p>

Additional Comments

TABLE 3

WebCode-Test	Additional Comments
2FRYWY-5355	Q1 corresponded to damage observed in the "C - D" area of the K1 tire photos. Q2 corresponded to damage observed in the "F - H" area of the K1 tire photos. Q3 corresponded to damage observed in the "B - C" area of the K1 tire photos. Q4 has similar class characteristics, but could be ELIMINATED by different wear characteristics from the K1 tire photos.
2QN8F2-5351	The lettering on the sign "Parking Sign" and the distortion on document Q2 would not let me reach a conclusion to identify or discard.
6VT6DY-5351	The way the inked impressions were made caused some ghosting of a tread design that was not due to the tire used in Item K.
9PXEQT-5351	Detail was sufficient in segment C-D to identify Q1. Detail in segment D-E overlapped segment C-D. Detail was sufficient in segment G-H to identify Q2. Detail in segment F-G overlapped segment G-H. Detail was sufficient in segments B-C to identify Q3. Detail in segment A-B overlapped segment B-C.
A87XUT-5351	There were some uncertainties at our lab about the naming of the segment. I.e. is "A" a segment (between A and B) or just a point on the tire?
AU2Q33-5351	The partial, questioned tire track impression, Q4, shares similar tire tread elements with the known tire in Submission K. The tire in Submission K has much more wear than the tire that made Q4.
BG9NYZ-5351	The photographs of the known tire K1-K8 were very dark and the way the tire was lit made it difficult to see details in the tire tread. Perhaps photographs of the tire using oblique lighting would have aided me in the examination. The test impressions appeared to have a second image of the known tire, possibly from the inking substrate retaining an image of the tire. This added some extra difficulty performing the comparison.
NA9CQF-5351	I was puzzled by the area of the different darker pattern within the region of the known imprints from the right side of segment A and including all of segment B, segment C, segment D and the left side of segment E. This additional pattern is incorporated into the pattern of the recovered tyre but is clearly not from the recovered tyre. This extra pattern appears to be of the same design as the eliminated tyre that made the Q4 impression and runs at a slight angle to the impression from the tyre that made Q1, Q2 and Q3. However the deposition of ink on the test imprints could not have been caused by one tyre simply rolling over an existing pattern to make a double impression, regardless of which tyre was used first. What I think could have caused this "double pattern" is the recovered tyre being inked, then a tyre with the same tread pattern that made the Q4 imprint being rolled against the recovered tyre - tread pattern contacting tread pattern. This would remove ink from the recovered tyre only in the tread pattern from the Q4 type tyre. If the recovered tyre was then rolled on paper to make an impression, the Q4 tyre tread would exist as dark ink, whilst the tread pattern on the recovered tyre would show as lighter areas, as is typically seen. This scenario is only possible if the tyres are contacting each other in the 'correct' orientation as the tread pattern from the Q4 type tyre is reversed twice during this process, once against the Q1/Q2/Q3 tyre and again when making the test imprint. If either tyre was rolled against each other rotated 180 degrees opposite to the direction in which the dual pattern was created, the tread pattern of the Q4 type tyre would be reversed. This was an interesting red herring to throw into this test, if indeed this is what has occurred. Perhaps there are other causes for this, but I believe my explanation could create what I saw (without having actually tried it.) If this explanation is not correct, I will be interested to hear how this was done - one pattern digitally inserted into another perhaps? Lastly, I believe at least two sets of test impressions of the recovered tyre should be provided in these tests in order to assess the reproducibility of the features made by the tyre. This is what I would do in casework and it is important to be able to take reproducibility into consideration when forming conclusions.
NPJ7ZM-5351	Q1 was made by a portion of "...Item K3 (segment C-D)..." and a portion of "...Item K4

TABLE 3

WebCode-Test	Additional Comments
	(segment D-E)...". Q2 was made by a portion of "...Item K6 (segment F-G)..." and a portion of "...Item K7 (segment G-H)...". Q3 was made by a portion of "...Item K1 (segment A-B)..." and a portion of "...Item K2 (segment B-C)...". In the future, it would be easier to report associations if the known tire was kept the same through out and only the segments were changed. By labeling an area K1 and then changing the next area to K2 it appears that there may be more than one tire. This would be avoided and make things simpler if it was just kept K1 (ie K1 (segment A-B), K1 (segment B-C), etc.).
U6UPBA-5351	Laboratory policy states that exclusions can only be made based on class characteristic differences.
VHCZD6-5355	The known tire is represented by photos of segments, K1-K8.
W64P9F-5351	The quality of K1-8 and K1_2 through K8_2 is lacking. Lighting in the tire photos is insufficient to see detail (outlines, depths, etc.) of the random characteristics in much of them. With better illumination of those details, I suspect an Identification could be reached for Items Q1 and Q2. Additionally, inked test impressions are apparently overridden by a second tire that removed ink and lightened the original. That creates distracting "noise" in the tests, making interpretation/evaluation of the transferred details difficult. Furthermore, the inked impressions are not uniform/thorough. It appears an inadequate ink, and inadequate amount of ink, and/or a rough surface beneath the inking material contribute(s) to the "blotchy" results, blurring the clarity between actual characteristics and ink voids. In actual casework, I would seek better test impressions (although those provided did allow me to find the necessary orientations for this test), and I would strive to take better photographs for documentation of the random characteristics on the tire (in addition to having the tire itself for examinations).
ZRPTH9-5351	There is an additional imprint (other than the known tire) running through the test impression of K1. This is most clear in segments B-E.

Appendix: Data Sheet

Collaborative Testing Services ~ Forensic Testing Program

Test No. 17-5351: Tire Track Imprint Evidence

DATA MUST BE RECEIVED BY October 30, 2017 TO BE INCLUDED IN THE REPORT

Participant Code:

WebCode:

Accreditation Release Statement

CTS submits external proficiency test data directly to ASCLD/LAB, ANAB, and 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 on the last page must be completed and submitted.)
- This participant's data is **NOT** intended for submission to ASCLD/LAB, ANAB, or A2LA.

Scenario:

Police are investigating the theft of materials from a construction site. Tire track imprints were recovered on several items found around the construction site, and it is believed that they may have been left by the suspect vehicle. A day after this incident, a suspected vehicle was found having its tires changed at an automotive shop approximately 18 miles from the site. Investigators were able to recover one tire directly from the vehicle; the others had already been removed and discarded. You are asked to compare the imprints recovered at the scene with photographs of the tire and known imprints made with the tire. The recovered tire contains the following information on the sidewall: Sumitomo 225/50 R18 95W M&S HTR A/S PO1; DOT R81N LM5R3912.

Known, inked imprints (K1_2 through K8_2) have been labeled with an arrow to indicate directionality of movement. These inked imprints were made by placing the vehicle in neutral and pushing it across inking material and subsequent rolled paper.

Items Submitted (Sample Pack TIEP):

K1-K8: Photographs of the recovered tire (segments), lighted from above.
 K1_2-K8_2: Known imprints made with the recovered tire (segments).
 Q1-Q2: Questioned imprints found on a "No Parking" sign.
 Q3-Q4: Questioned imprints found on a cardboard box.

Please return all pages of this data sheet.

Page 1 of 4

Participant Code:

WebCode:

Instructions:

Select from the following list of conclusions and insert the appropriate letter in the spaces provided. If the wording below differs from the normal wording of your conclusions, adapt these conclusions as best you can and use your preferred wording in your written conclusions. These conclusions are adapted from the SWGTREAD Range of Conclusions standard.

- A. **Identification** - Questioned and known items share agreement of class and randomly acquired characteristics of sufficient quality and quantity. Highest degree of association.
- B. **High degree of association** - Correspondence of class characteristics, in addition to unusual wear and/or one or more randomly acquired characteristics between the questioned and known item.
- C. **Association of class characteristics** - Correspondence of design and physical size and possibly general wear between the questioned and known item.
- D. **Limited association of class characteristics** - Some similar class characteristics between the questioned and known item with significant limiting factors.
- E. **Inconclusive*** - Questioned item lacks sufficient detail for a meaningful conclusion in comparison to the known item. *(adapted from SWGTREAD "Lacks sufficient detail" conclusion)*
- F. **Indications of non-association** - Questioned item exhibits dissimilarities in comparison to the known item.
- G. **Exclusion** - Questioned and known items exhibit sufficient differences of class and randomly acquired characteristics. Highest degree of non-association.

**Should the response "E" be used, please document the reason in the Additional Comments section of this data sheet.*

1.) Indicate the results of your comparisons of the recovered tire with the questioned imprints by writing the letter of your conclusion next to each questioned imprint in the table.

If an identification or positive association is made (A-D), indicate to which segment(s) of the tire the association has been made (indicate the letters at the beginning and end of the corresponding segments).

Example:

	<u>Imprint</u>	<u>Segment(s)</u>		<u>Imprint</u>	<u>Segment(s)</u>
Q1:	B	C - E	Q2:	A	G - H

<i>Parking Sign</i>			<i>Cardboard Box</i>		
	<u>Imprint</u>	<u>Segment(s)</u>		<u>Imprint</u>	<u>Segment(s)</u>
Q1:	_____	____-____	Q3:	_____	____-____
Q2:	_____	____-____	Q4:	_____	____-____

Participant Code:

WebCode:

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

3.) Additional Comments

<p>Return Instructions: Data must be received via online data entry, fax (please include a cover sheet), or mail by <i>October 30, 2017</i> to be included in the report. Emailed data sheets are not accepted.</p>	<p>Participant Code: ONLINE DATA ENTRY: www.cts-portal.com FAX: +1-571-434-1937</p>
<p>QUESTIONS? TEL: +1-571-434-1925 (8 am - 4:30 pm EST) EMAIL: forensics@cts-interlab.com www.ctsforensics.com</p>	<p>MAIL: Collaborative Testing Services, Inc. P.O. Box 650820 Sterling, VA 20165-0820 USA</p>

Collaborative Testing Services ~ Forensic Testing Program

RELEASE OF DATA TO ACCREDITATION BODIES

The following Accreditation Releases will apply only to:

Participant Code:

WebCode:

for Test No. **17-5351: Tire Track Imprint Evidence**

This release page must be completed and received by **October 30, 2017** to have this participant's submitted data included in the reports forwarded to the respective Accreditation Bodies.

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

ASCLD/LAB Certificate No. _____

ANAB Certificate No. _____

A2LA Certificate No. _____

Step 2: Complete the Laboratory Identifying Information in its entirety

Signature and Title _____

Laboratory Name _____

Location (City/State) _____

Accreditation Release

Return Instructions

Please submit the completed Accreditation Release at the same time as your full data sheet. See Data Sheet Return Instructions on the previous page.

*Questions? Contact us 8 am-4:30 pm EST
Telephone: +1-571-434-1925
email: forensics@cts-interlab.com*

Please return all pages of this data sheet.

Page 4 of 4