



Toolmarks Examination Test No. 25-5281 Summary Report

Each participant received a sample pack containing tool(s) and material(s) with questioned toolmarks, which they were asked to examine. Data were returned from 118 participants and are compiled into the following tables:

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

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

Manufacturer's Information

Each sample pack contained tool(s) and material(s) with questioned toolmarks. Participants were asked to determine if any of the questioned toolmarks were made by the submitted tool(s).

SAMPLE PREPARATION: To assist examiners, each paint can lid was marked with paint to identify it to its item number. Before use, each cold chisel was inspected for defects and then "broken in" by striking paint can lids. This removed any manufacturing residue and ensured the full blade touched the surface of the lid.

IDENTIFICATION ITEMS: Paint can lids were struck with the provided cold chisel, using a jig to ensure consistency.

ELIMINATION ITEMS: Paint can lids were struck with a different cold chisel, not provided for examination, using a jig to ensure consistency.

SAMPLE PACK ASSEMBLY: The elimination items were placed into their respective pre-labeled envelopes and sealed. The identification items were also placed into their respective pre-labeled envelopes and sealed. The corresponding tool for each identification item was labeled, packaged in bubble wrap, and placed directly into the same pre-labeled sample pack box as its associated identification item. Subsequently, one of each of the elimination items was packaged into a pre-labeled sample pack box along with additional material (unmarked paint can lids) intended for testing purposes.

VERIFICATION: Predistribution results were consistent with each other and the manufacturer's preparation information. In addition, ten randomly selected sample packs were verified by a qualified toolmark examiner who confirmed the manufacturer's preparation information.

Preparation Information					
Item	Known/ Questioned	Identification/ Elimination	Tool	Angle of Toolmark	Material Description
1	Known	---	Mayhew ¾" x 7" Cold Chisel	---	---
2	Questioned	Identification	Mayhew ¾" x 7" Cold Chisel	45°	Paint can lid with blue paint
3	Questioned	Elimination	Irwin ¾" x 6 ⅞" Cold Chisel	45°	Paint can lid with red paint

Summary Comments

This test was designed to allow participants to assess their proficiency at a toolmark examination involving striated/struck impression marks. Participants were supplied with one cold chisel (Item 1) and two paint can lids containing questioned toolmarks (Items 2 and 3). The toolmarks on Item 2 were created with the Item 1 tool that was provided for examination. The toolmarks on Item 3 were created by a tool that was not provided for examination. Refer to the Manufacturer's Information for preparation details.

Among the 118 responding participants, 116 (98%) identified the toolmarks on the Item 2 and either eliminated or reported inconclusive for Item 3 as having been created by the Item 1 tool. The remaining two participants identified both Item 2 and Item 3 as having been created by the Item 1 tool.

Examination Results

Were the questioned toolmarks on either of the paint can lids (Item 2 and Item 3) produced by the suspect's cold chisel (Item 1)?

TABLE 1

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
2BMBDB	Yes	No	9LXYMA	Yes	No
2MYGQY	Yes	No	A2P72M	Yes	No
2XKKXX	Yes	No	AD3BB4	Yes	Inc
3B4MTV	Yes	No	AN3738	Yes	No
3BY7VW	Yes	No	AR2GX8	Yes	No
3JV8QG	Yes	Inc	B67TBL	Yes	No
3UR7MT	Yes	No	BF4Y3Y	Yes	No
4M7K9E	Yes	No	BHR9EK	Yes	No
4Y3J37	Yes	No	C62X4Z	Yes	No
6EQEUM	Yes	No	C7WG62	Yes	No
6TW6WV	Yes	No	CAXKWN	Yes	No
6X7PH8	Yes	No	CDFLZM	Yes	No
6XQ496	Yes	No	CDXVTN	Yes	No
76JWVP	Yes	No	CGFXVM	Yes	No
7KBVK4	Yes	No	CQKZZK	Yes	No
86YH47	Yes	No	CUGLRM	Yes	No
87WPCP	Yes	No	CVD6TN	Yes	No
8NA8HP	Yes	Inc	D3NPA6	Yes	No
8UV3VM	Yes	No	DMWQNX	Yes	No
8VP8DR	Yes	No	DN79KH	Yes	No
8Y8AGR	Yes	No	E4YP8K	Yes	No
99CJJA	Yes	No	E6CEDJ	Yes	No
99UTAQ	Yes	No	EEZ9PF	Yes	No
9CEDLL	Yes	No	EGQCHM	Yes	No
9LKK2L	Yes	No	FD2PZJ	Yes	No

TABLE 1

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
FLF9KH	Yes	No	NDV6QM	Yes	No
FMCRLK	Yes	No	NVFPVPL	Yes	No
FXB3RF	Yes	No	NZAMY4	Yes	No
G6NVJV	Yes	No	P2ZBV6	Yes	No
GL9LHV	Yes	No	PFDJUM	Yes	No
GM44JW	Yes	No	PH89E4	Yes	No
GTVEUU	Yes	No	PT26C6	Yes	No
HP68MD	Yes	No	Q7MHT4	Yes	No
HRVTHE	Yes	No	Q8H2U6	Yes	Inc
HVTCJD	Yes	Inc	Q9YXM6	Yes	No
HVXUHC	Yes	Inc	QCTYHR	Yes	No
JL8FAZ	Yes	Yes	QHYN2K	Yes	No
K3NWYE	Yes	No	QPJQ9M	Yes	Inc
KDMUKT	Yes	No	QXUK26	Yes	No
KFB27B	Yes	No	RBC3QR	Yes	No
KL47ZE	Yes	No	REYYXH	Yes	No
KN77ZC	Yes	No	RMA2JJ	Yes	No
KYNK3E	Yes	No	RQNV22	Yes	No
KZ2CTA	Yes	No	RQTDZZ	Yes	No
L7VKA3	Yes	Inc	RTWQ29	Yes	No
LECFTA	Yes	Inc	RY6A68	Yes	No
LQ9NBC	Yes	No	TMKHT3	Yes	No
MD3RRB	Yes	Inc	TRVFGP	Yes	No
MU78BP	Yes	No	TXNDC8	Yes	No
N4RQ7A	Yes	No	UB7MCH	Yes	No
N9KPK6	Yes	Inc	UGYPH3	Yes	No
NAVUUM	Yes	No	UPQ8R6	Yes	Yes

TABLE 1

WebCode	Item 2	Item 3	WebCode	Item 2	Item 3
VLNN94	Yes	No			
VUHT36	Yes	No			
VXZV64	Yes	No			
W9QHGY	Yes	No			
WEEULL	Yes	No			
WM9YEM	Yes	No			
WTGFU3	Yes	No			
WWJ2ZM	Yes	No			
XFARFD	Yes	No			
XQ7X9C	Yes	No			
XPYTV	Yes	No			
YPVBBX	Yes	No			
YZPNBU	Yes	No			
ZDQPFH	Yes	No			

Response Summary			Total Participants: 118
<i>Were the questioned toolmarks on either of the paint can lids (Item 2 and Item 3) produced by the suspect's cold chisel (Item 1)?</i>			
	<u>ITEM 2</u>	<u>ITEM 3</u>	
Yes	118 (100.0%)	2 (1.7%)	
No	0 (0.0%)	105 (89.0%)	
Inc	0 (0.0%)	11 (9.3%)	

Conclusions

TABLE 2

WebCode	Conclusions
2BMBDB	Microscopic examination and comparison reveal that the questioned toolmark on Item 1.B was made by the tool, Item 1.A, based on agreement of class and individual characteristics. Microscopic examination and comparison reveal that the questioned toolmark on Item 1.C was not made by the tool, Item 1.A, based on disagreement of individual characteristics. Microscopic examination of the questioned toolmark, Item 1.C, reveals that it is consistent with being made by a flat action type tool. This list is provided only as an investigative lead and is not intended to be an all-inclusive list. Two paint can lids from Item 1.D were used to test the tool, Item 1.A.
2MYGQY	The toolmark on the paint can lid, Lab Item 2, was identified as having been produced by the tool, Lab Item 1, based on agreement of class characteristics and corresponding individual detail using microscopic comparison. The toolmark on the paint can lid, Lab Item 3, was eliminated from having been produced by the tool, Lab Item 1, based on disagreement of class characteristics using microscopic comparison.
2XKXX	Based on microscopic comparisons, in the opinion of the laboratory, the toolmark on item 1-2-1 (paint can lid; CTS Item 2) was identified as having been made by item 1-1 (cold chisel; CTS Item 1). Based on differences in class characteristics, the toolmark on item 1-3-1 (paint can lid; CTS Item 3) was eliminated as having been made by item 1-1 (cold chisel: CTS Item 1).
3B4MTV	The toolmark present on the item 1-2 lid is identified as having been created by the item 1-1 chisel. The toolmark present on the item 1-3 lid is eliminated as having been created by the item 1-1 chisel. The item 1-4 paint can lids were utilized to create test samples. All test samples will be forwarded to the submitting agency.
3BY7WW	Item Examinations Item 1 - One (1) Mayhew brand ¾ inch cold chisel Item 2 - One (1) metal paint can lid with blue paint mark and toolmark observed. Item 3 - One (1) metal paint can lid with red paint mark and toolmark observed. Microscopic Comparison Results Test toolmarks were obtained by using Item 1 (cold chisel) and compared with the toolmarks on Items 2 & 3 with the following results: Item 1 (cold chisel) was used to cause the toolmark on Item 2. Item 1 (cold chisel) did not cause the toolmark on Item 3 (different class characteristics). [Participant submitted data in a format that could not be reproduced in this report.]
3JV8QG	Results of Examinations: Item 1 is a Mayhew Tools cold chisel, which uses a scraping, prying, or impressing action. Items 2 and 3 are paint can lids bearing a toolmark that is both striated and impressed. Toolmarks present on the Item 2 paint can lid were identified as having been produced by the Item 1 cold chisel. A pattern examination of toolmarks present on the Item 3 paint can lid and Item 1 cold chisel were inconclusive due to insufficient quality and/or quantity of corresponding individual characteristics.
3UR7MT	The Item 1 chisel was examined and two (2) tests were produced from laboratory stock materials. The resultant tests produced using laboratory stock materials are being returned as Item 1T in container 1 and should be maintained for possible future examinations. Toolmarks present on Item 2 were microscopically examined and identified as having been produced by the Item 1 tool based on corresponding class and individual characteristics. Toolmarks present on Item 3 were microscopically examined and eliminated as having been produced by the Item 1 tool due to differences in class characteristics.
4M7K9E	After examination it was found that the lid with red mark (item 3) didn't match with the suspected item. whereas the lid with blue mark (item 2) matched with suspected tool.
4Y3J37	Side 1 of the tool was found to have sufficient individual agreement to identify it has having made the exhibit toolmark marked Item 2. Side 2 was not able to be identified to the toolmark marked Item 2. Agreement in class characteristics but sufficient disagreement in individual marks to eliminate it as having made the exhibit toolmark marked Item 3.
6EQEUM	Item 2 was microscopically compared with test specimens produced by the Item 1 tool, revealing correspondence of class characteristics and individual distinguishing characteristics. It was concluded that the Item 2 toolmark was made by the Item 1 tool blade. Item 3 was microscopically compared with test specimens produced by the Item 1 tool, revealing class characteristic differences (Item 1

TABLE 2

WebCode	Conclusions
	blade too wide to have made mark on Item 3). It was concluded that the Item 3 toolmark was not made by the Item 1 tool.
6TW6WV	The toolmarks on the paint can lid, Lab Item 2, were identified as having been produced by the tool, Lab Item 1, based on agreement of class characteristics and corresponding individual detail using microscopic comparison. The toolmarks on the paint can lid, Lab Item 3, were eliminated from having been produced by the tool, Lab Item 1, based on disagreement of class characteristics using microscopic comparison.
6X7PH8	The cold chisel tool submitted was used to produce toolmarks for comparison purposes. Comparison microscope examinations were conducted on the evidence listed above. The findings of this examiner are the following: Suspect toolmark observed on Exhibit 1.2 (Item 2) was created with Exhibit 1.1 (Item 1) based on sufficient agreement of individual characteristics present. Suspect toolmark observed on Exhibit 1.3 (Item 3) was not created with Exhibit 1.1 (Item 1) due to the differences in class and individual characteristics present. No further analysis was conducted on the submitted evidence at this time.
6XQ496	The cold chisel (Item 1), was used to create the toolmark observed on the paint lid (Item 2, marked with blue paint). The toolmark observed on the paint lid (Item 3, marked with red paint), was not created by the cold chisel (Item 1).
76JWVP	Findings in reports are table generated, so complete sentences are not used. However, if they were, the report would state something similar to the following: The toolmark on Item 2 was identified as having been made by the tool in Item 1. The toolmark on Item 3 was eliminated as having been made by the tool in Item 1.
7KBVK4	I am of the opinion that the recovered toolmark found in the paint can lid in item 2 was made by the cold chisel in item 1. The recovered toolmark found in the paint can lid in item 3 was not made by the cold chisel in item 1.
86YH47	The Exhibit 1 chisel was used to make test toolmarks. The test toolmarks were designated as Exhibit 1.1. The Exhibit 2 paint can lid toolmark was identified as having been made by the Exhibit 1 tool. The Exhibit 3 paint can lid toolmark was excluded as having been made by the Exhibit 1 tool.
87WPCP	(2 and 3) The mark in Items 2 and 3 have been examined and compared microscopically with each other and test marks made using the submitted chisel, Item 1. Based on the observed agreement of their class characteristics and sufficient agreement of their individual characteristics, the mark in Item 2 was identified as having been made by the chisel Item 1. The mark in Item 3 was not made by Item 1 based on a difference of class characteristics.
8NA8HP	Microscope Comparison Conclusions Identification - Agreement of class and individual characteristics were observed. It is the opinion of the examiner that the observed toolmarks were created by the same tool. Inconclusive - Agreement of class characteristics without agreement or disagreement of individual characteristics were observed. This may be due to damage or lack of reproduced individual characteristics. The examiner is unable to identify or exclude the observed toolmarks as having been created by the same tool. Lab Item Evidence Type To Lab Item Evidence Type Conclusion 1B Tool Mark 1A Tool Identification 1C Tool Mark 1A Tool Inconclusive [Participant submitted data in a format that could not be reproduced in this report.]
8UV3VM	1. Examination of Exhibit 1 revealed one ferromagnetic Mayhew brand cold chisel designed to be used as a striking/compression, prying or scraping action tool. Test standards, sub-exhibited as Exhibit 1.1, were created using Exhibit 1 and will be retained with evidence. 2. Examination of Exhibit 2 and 3 each revealed one ferromagnetic paint can lid displaying damage consistent with that caused by a striking and scraping type of tool. Toolmarks are suitable for microscopic comparison. Casts, sub-exhibited as Exhibit 2.1 and 3.1, were created and will be retained with evidence. 3. Exhibit 1.1 (test standards) and Exhibits 2 and 3 (unknowns) were microscopically compared to each other: a. The damage on Exhibit 2 was caused by the Exhibit 1 (tool) due to sufficient agreement of individual characteristics. b. The damage on Exhibit 3 was not caused by the Exhibit 1 (tool) due to sufficient disagreement of class characteristics.
8VP8DR	[No Conclusions Reported.]
8Y8AGR	Toolmarks present on the Item 2 lid were identified as having been produced by the Item 1 cold chisel.

TABLE 2

WebCode	Conclusions
99CJJA	[No Conclusions Reported.]
99UTAQ	Results of Examinations: Item 1 is a Mayhew Tools cold chisel tool capable of chopping, compression, and slicing actions. Items 2 and 3 are physically consistent with two (2) paint can lids which were each received bearing toolmarks on their exterior-facing surfaces. Toolmarks present on the Item 2 paint can lid were identified as having been produced by the Item 1 chisel. The toolmarks on the Item 3 paint can lid were excluded as having been produced by the Item 1 chisel due to a measurable difference in class characteristics.
9CEDLL	Examinations showed that the tool mark contained on Item 2 (M-1) was produced by Item 1. Examinations showed that the tool mark contained on Item 3 (M-2) was not produced by Item 1.
9LKK2L	The Item 01-02 toolmark was identified as having been made by the Item 01-01 chisel. The Item 01-03 toolmark was eliminated as having been made by the Item 01-01 chisel due to differences in class characteristics.
9LXYMA	Test toolmarks created using the cold chisel, item 1, were microscopically compared to the toolmarks exhibited on the paint can lid, items 2 and 3 with the following results: 1. The toolmarks exhibited on item 2, were identified as having been created using the cold chisel, item 1, based on agreement of discernible class characteristics and sufficient agreement of individual characteristics. 2. The toolmarks exhibited on item 3 were eliminated as having been created using the cold chisel, item 1, based on disagreement of class and individual characteristics.
A2P72M	The toolmarks present on Item #2 were made by the tool in Item #1. The toolmarks present on Item #3 were not made by the tool in Item #1.
AD3BB4	The Exhibit 2 toolmarks were identified as having been produced by the Exhibit 1 chisel. The Exhibit 3 toolmarks could not be identified or excluded as having been made by the Exhibit 1 chisel based on agreement of all discernible class characteristics and neither sufficient agreement nor sufficient disagreement of individual characteristics. The result of the comparison was inconclusive.
AN3738	[No Conclusions Reported.]
AR2GX8	Due to corresponding characteristics found in the questioned toolmarks on paint can lid item 2-blue and characteristics of suspect's cold chisel item 1, the questioned toolmarks on paint can lid item 2-blue were produced with suspect's cold chisel item 1. Due to differences found in characteristics of the questioned toolmarks on paint can lid item 3-red and characteristics of suspect's cold chisel item 1, the questioned toolmarks on paint can lid item 3-red were not produced with suspect's cold chisel item 1.
B67TBL	The toolmarks present on Item #2 were made using the tool in Item #1. Toolmarks present on Item #3 were not made using the tool in Item #1 - Elimination on class characteristics
BF4Y3Y	As a result of my examination I formed the following opinions: 1. The cold chisel listed as item 1 caused the toolmark damage present on the paint can lid listed as item 2. This was based on agreement of all discernible class characteristics and sufficient agreement of individual characteristics within the toolmark. 2. The cold chisel listed as item 1 did not cause the toolmark damage present on the paint can lid listed as item 3. This was based on disagreement of all discernible class characteristics and sufficient disagreement of individual characteristics within the toolmark.
BHR9EK	Toolmarks present on Item #1-2 were made by the submitted tool labeled Item #1-1. Toolmarks present on Item #1-3 were not made by the submitted tool labeled Item #1-1.
C62X4Z	The toolmark on exhibit 2 (item 2) was identified as having been made by exhibit 1 (item 1), the submitted chisel. The toolmark on exhibit 3 (item 3) was not made by exhibit 1 (item 1), the submitted chisel, based on differences in class characteristics.
C7WG62	The Exhibit 1 chisel was used to make test toolmarks. The test toolmarks were designated as Exhibit 1.1T1 – 1.1T5. The Exhibit 2 can lid toolmarks were identified as having been made by the Exhibit 1 tool. The Exhibit 3 can lid toolmarks were excluded as having been made by the Exhibit 1 tool.
CAXKWN	[No Conclusions Reported.]
CDFLZM	Item 1 is a chisel bearing manufacturer markings that read "72212 MAYHEW USA 3/4" and "WEAR SAFETY GOGGLES SS." Items 2 and 3 each consist of a paint can lid bearing striated toolmarks of value and impressed marks of limited value from a scraping type tool. Toolmarks present on the Item

TABLE 2

WebCode	Conclusions
	2 paint can lid were identified as having been produced by the Item 1 chisel. The toolmarks present on the Item 3 paint can lid were excluded as having been produced by the Item 1 chisel.
CDXVTN	[No Conclusions Reported.]
CGFXVM	Item 1 is a "MAYHEW" brand cold chisel. Item 2 and Item 3 each consist of a paint can lid which bear impressed and striated toolmarks of value consistent with having been produced by a tool that utilizes a scraping action. Toolmarks present on the Item 2 paint can lid were identified as having been produced by the Item 1 cold chisel. Toolmarks present on the Item 3 paint can lid were excluded as having been produced by the Item 1 cold chisel. Furthermore, the toolmarks present on the Item 2 paint can lid and the Item 3 paint can lid were excluded as having been produced by the same tool.
CQKZZK	The toolmark on the paint can in Item #2 was made by side A of the chisel in Item #1. The toolmark on the paint can in Item #3 was not made by the chisel in Item #1 due to differences in class characteristics.
CUGLRM	The toolmarks on the paint can lid, Lab Item 2, were identified as having been produced by the tool, Lab Item 1, based on agreement of class characteristics and corresponding individual detail using microscopic comparison. The toolmarks on the paint can lid, Lab Item 3, were eliminated from having been produced by the tool, Lab Item 1, based on disagreement of class characteristics using microscopic comparison.
CVD6TN	[No Conclusions Reported.]
D3NPA6	Toolmark on the paint can lid "Item 2" marked with blue paint, recovered from the crime scene was made by cold chisel recovered from suspect "Item 1". Toolmark on the paint can lid "Item 3" marked with red paint, recovered from the crime scene was not made by cold chisel recovered from suspect "Item 1".
DMWQNX	1. The exhibit cold chisel (Item 1) was identified within the limits of practical certainty as the source of the tool mark imparted to the exhibit Paint can lid (Item 2). 2. The exhibit cold chisel (Item 1) was eliminated from being the source of the tool mark imparted to the exhibit Paint can lid (Item 3). 3. The elimination was based on the significant disagreement in class characteristics and individual characteristics.
DN79KH	1. Examination of Exhibit 1 revealed one ferromagnetic Mayhew brand chisel designed to be used as a prying action tool. Exhibit 1 was used to create the Exhibit 1.1 test standards. 2. Examination of Exhibits 2 and 3 revealed each contains one ferromagnetic lid displaying damage consistent with that caused by prying action tools such as chisels and screwdrivers. Exhibits 2 and 3 are suitable for microscopic comparison. 3. Microscopic comparison revealed the damage on Exhibit 2 was caused by Exhibit 1 due to sufficient agreement of individual characteristics. 4. Microscopic comparison revealed the damage on Exhibit 3 was not caused by Exhibit 1 due to disagreement of class characteristics.
E4YP8K	Each of the two damaged paint can lids (Item 2, Item 3) recovered from the scene wears an impressed toolmark, likely made by a cold chisel or a similarly shaped tool. For comparison, we created test marks by striking the tailpiece of the questioned cold chisel (Item 1) while positioning its chamfered head against test lids at various angles to produce marks from both faces of the bevel. Upon inspection, we found that the test marks exhibited sufficiently reproducible individual characteristics for meaningful comparison. These characteristics matched those of the toolmark on Item 2 but were entirely incompatible with those on Item 3. Therefore, we conclude that the toolmark on Item 2 was made by the questioned cold chisel (Item 1), while the toolmark on Item 3 was made by a different tool.
E6CEDJ	The item 1 chisel was functional when tested. The item 2 lid is identified as having been marked by the item 1 chisel. The item 3 lid is eliminated as having been marked by the item 1 chisel. All test samples will be forwarded to the submitting agency.
EEZ9PF	The toolmarks on Item 2 were produced by Item 1. The toolmarks on Item 3 were not produced by Item 1.
EGQCHM	Items #2 and #3 were eliminated as being made by the same tool. The marks on item #2 are identified as the being created by the submitted cold chisel. item #1, due to significant agreement seen in the class and individual characteristics during comparison. The marks on item #3 are

TABLE 2

WebCode	Conclusions
	eliminated as being made by the submitted cold chisel, item #1, due to difference in width and characteristics of the striations seen on the marks. See photos for areas of comparison.
FD2PZJ	1-1: Toolmark(s): Identification-toolmark to 1 Tool. 1-2: Toolmark(s): Elimination-class characteristic differences to 1 Tool.
FLF9KH	The toolmarks on the can lid marked "Item 2" were produced by the chisel marked "Item 1". The toolmarks on the can lid marked "Item 3" were unlikely to be produced by the chisel marked "Item 1".
FMCRLK	Toolmarks on Item #2 were made by the tool in Item #1. Toolmarks on Item #3 were not made by the tool in Item #1.
FXB3RF	1. Exhibit 1 is a Mayhew brand chisel designed to be used as a scraping tool. Exhibit 1 was used to create the Exhibit 1.1 test standards. 2. Examination of Exhibits 2 and 3 each revealed one paint can lid with damage on the flat area. a. The damage present on Exhibits 2 and 3 is consistent with having been caused by a tool used in a scraping motion. b. Microscopic comparison revealed the Exhibit 1 chisel caused the damage on Exhibit 2 based on sufficient agreement of class and individual characteristics. c. The Exhibit 1 chisel did not cause the damage on Exhibit 3 based on disagreement of class characteristics.
G6NVJV	The submitted cold chisel tool was used to produce toolmarks for comparison purposes. Comparison microscope examinations were conducted on the evidence listed above. The findings of this examiner are the following: 1. Suspect toolmark observed on Exhibit 1.2 was created with Exhibit 1.1 based on sufficient agreement of individual characteristics present. 2. Suspect toolmark observed on Exhibit 1.3 was not created with Exhibit 1.1 due to the differences in class and individual characteristics present. No further analysis was conducted on the submitted evidence at this time.
GL9LHV	I compared the paint can lids item 2 and 3 with each other and found different class of toolmark (tool tip width) Conclusion: Items 2 and 3 were marked with different tools. I compared the paint can lids item 2 and 3 with test impression made with item 1 and found sufficient correspondence of individual marks between items 2 and test marks from item 1 for identification. Conclusion: Item 1 was used to cause the impression in paint can lid item 2 and is excluded as having made the mark on Item 3.
GM44JW	Microscopic examination and comparison reveal that the questioned toolmark on Item 1.B was made by the tool, Item 1.A, based on agreement of class and individual characteristics. Microscopic examination and comparison reveal that the questioned toolmark on Item 1.C was not made by the tool, Item 1.A, based on disagreement of individual characteristics. Microscopic examination reveals that the questioned toolmark on Item 1.C is suitable for further comparison and is consistent with having been made by a prying tool. Two paint can lids from Item 1.D were used to make test marks of the tool, Item 1.A.
GTVEUU	Toolmark Analysis: Methodology – Physical (Visual Examination) Microscopy (Comparison Microscopy) Test marks were made with Item 1, the Mayhew Tool chisel, using the submitted testing material. Item 1A, the test marks, was sealed in a manila envelope and will be returned with the evidence to the submitting agency. The tool mark on Item 2, the paint can lid, was made with Item 1, the Mayhew Tool chisel, based upon corresponding class and individual microscopic characteristics. The tool mark on Item 3, the paint can lid, was not made with Item 1, the Mayhew Tool chisel, based upon different class and individual microscopic characteristics.
HP68MD	1. Examination of Exhibit 1 revealed one Mayhew 72212 3/4" Chisel designed to be used as a prying/scraping action tool. a. Exhibit 1 is ferromagnetic and approximately 176mm in total length. b. Exhibit 1 was used to create test standards that were sub-exhibited as Exhibit 1.1. These test standards are suitable for microscopic comparison. 2. Examination of Exhibits 2 and 3 revealed each contains one ferromagnetic paint can lid displaying damage consistent with that caused by a prying/scraping action tool such a chisel, pry bar, or screwdriver. The observed toolmarks are suitable for comparison. 3. Microscopic comparison of Exhibits 1.1, 2, and 3 revealed the following: a. The damage on Exhibit 2 was caused by Exhibit 1 due to sufficient agreement of individual characteristics. b. The damage on Exhibit 3 was not caused by Exhibit 1 due to disagreement of class characteristics. 4. Please see photos for measurements and markings. All measurements are approximate. [Photos not included.]
HRVTHE	The chisel of item #1 was examined and used to make test toolmarks into lead and sample blank paint can lids. The toolmark located on item #2 was microscopically identified as having been made by the submitted chisel of item #1. The toolmark located on item #3 was microscopically eliminated

TABLE 2

WebCode	Conclusions
	from having been made by the submitted chisel of item #1 based on differences in class and individual characteristics.
HVTCJD	Microscope Comparison Conclusions Lab Item # Evidence Type To Lab Item # Evidence Type Conclusion 1B Tool Mark 1A Tool Identification 1C Tool Mark 1A Tool Inconclusive. [Participant submitted data in a format that could not be reproduced in this report].
HVXUHC	The Item 01-01 Mayhew chisel was identified as having struck the Item 01-02 paint can lid. The Item 01-01 Mayhew chisel could neither be identified nor eliminated as having struck the Item 01-03 paint can lid. There is agreement of all discernible class characteristics and disagreement of individual characteristics, but insufficient for an elimination.
JL8FAZ	The questioned toolmarks on item 2 and item 3 were made by the suspect's cold chisel (item 1).
K3NWEY	The toolmark on the Item 2 lid is identified as having been created by the Item 1 chisel. The toolmark on the Item 3 lid is eliminated from having been created by the Item 1 chisel.
KDMUKT	The toolmark on the paint can lid, Item 2, was produced by the chisel, Item 1. There was sufficient agreement of surface contours and/or microscopic toolmarks for identification. The toolmark on the paint can lid, Item 3, was not produced by the chisel, Item 1. This elimination is based on differences in class characteristics.
KFB27B	One of the paint can lids (1-02) was identified as having been marked by the submitted chisel (1-01) due to consistent and repeatable pattern areas of marks. One of the paint can lids (1-03) was eliminated as having been marked by the submitted chisel (1-01) due to differences in observed class characteristics.
KL47ZE	A comparison of the tool marks on the two paint can lids in items 2 and 3 with test marks made using the suspected chisel, item 1 was undertaken. A high degree of correspondence was noted between the tool marks on item 2 and the test marks made using the chisel. There was no correspondence with the tool marks on item 3 and the test marks made using the chisel. I have considered the proposition that the tool marks on paint can lid in item 2 were made using the suspected chisel, item 1; the results of this examination provide conclusive support for this proposition. The tool marks on the paint can lid in item 3 have not been made by the submitted tool, item 1. The scale I have used in the assessing the strength of evidence is as follows: No support – Weak Support – Support – Strong Support – Conclusive Support
KN77ZC	Unknown toolmark #2 was made by the tool in Item #1. Unknown toolmark #3 was eliminated as having been made by the tool in Item #1.
KYNK3E	Test marks made by Item 1-1 were microscopically compared to the toolmark on Item 2 and found to have areas of corresponding individual characteristics. Item 1-1 was identified as having made the mark on Item 1-2. Test marks made by Item 1-1 were microscopically compared to the toolmark on Item 1-3 and found to have different class characteristics with respect to blade width. Item 1-1 was eliminated as having made the mark on Item 1-3.
KZ2CTA	The Item 1 Mayhew cold chisel was examined. Ten tests were produced in laboratory stock material using Item 1 and are being returned as Item 1A1T and 1B1T in Sample Pack T1 and should be retained for possible future examinations. A toolmark on Item 2 was microscopically examined and identified as having been produced by the Item 1 cold chisel based on corresponding class and individual characteristics. A toolmark on Item 3 was microscopically examined and eliminated as having been produced by the Item 1 cold chisel due to differences in class characteristics.
L7VKA3	The strike/toolmark on the Paint Can Lid (Item #2) was identified as having been produced from the Cold Chisel (Item #1). Agreement of the characteristics is sufficient to determine that the Cold Chisel (Item #1) was the source of the strike/toolmark on the Paint Can Lid (item #2). The strike/toolmark on the Paint Can Lid (Item #3) could not be conclusively identified or excluded as having produced from the Cold Chisel (Item #1). However, it is inconsistent that the strike/toolmark on the Paint Can Lid (Item #3) was produced from the Cold Chisel (Item #1). There was agreement of all discernible class characteristics and disagreement of some characteristics, but the disagreement was insufficient for exclusion.
LECFTA	The toolmarks present on Item A1-2 paint can lid were examined, compared microscopically, and identified as having been produced by the Item A1-1 cold chisel. The toolmarks present on the Item

TABLE 2

WebCode	Conclusions
	A1-3 paint can lid exhibit the same discernible class characteristics as those produced by the Item A1-1 cold chisel; however, because of the lack of sufficient suitable corresponding microscopic markings, it was not possible to identify or eliminate the Item A1-1 cold chisel as having produced the toolmarks on the Item A1-3 paint can lid. An Identification conclusion is based on an examiner's determination that all discernible class and individual characteristics agree such that the extent of agreement exceeds that which has been demonstrated by toolmarks made by different tools and is consistent with the agreement demonstrated by toolmarks known to have been made by the same tool.
LQ9NBC	The item 001.001 chisel was examined, and test standards were made for comparison purposes. Sufficient agreements of class and individual characteristics confirmed the toolmark on the item 001.002 was created from the item 001.001 chisel. Agreements of class characteristics were observed between the toolmark on item 001.003 and the item 001.001 chisel. However, sufficient disagreement of individual characteristics confirmed the toolmark on item 001.003 was not created by the item 001.001 chisel.
MD3RRB	Items 1B, 1C, and 1A-TM1 through 1A-TM13 (paint can lids and test toolmarks made with Item 1A) were physically examined then microscopically compared using light comparison microscopy. Tool marks observed on Item 1B (paint can lid) are identified as having been produced by Item 1A (Mayhew chisel). Tool marks observed on Item 1C (paint can lid) are inconclusive as having been produced by Item 1A (Mayhew chisel). These items share agreement of class characteristics, but some disagreement of the individual characteristics observed in the striated toolmarks. The differences observed are insufficient for an elimination. Tool marks observed on Items 1B and 1C (paint can lids) are inconclusive as having been produced by the same tool. These items share agreement of class characteristics, but some disagreement of the individual characteristics observed in the striated toolmarks. The differences observed are insufficient for an elimination.
MU78BP	The tool marks present on the Item 2 paint can lid were microscopically identified as having been made by the Item 1 chisel. The tool marks present on the Item 3 paint can lid were not made by the Item 1 chisel.
N4RQ7A	Items 1B and 1C (tin lids) and test marks from Item 1A (chisel) were physically examined then microscopically compared using light comparison microscopy. Toolmarks on Item 1B (tin lid) are identified as having been produced by Item 1A (chisel). Toolmarks on Item 1C (tin lid) are eliminated as having been produced by Item 1A (chisel). There are differences in class characteristics (blade width). Test marks will be returned to the submitting agency.
N9KPK6	The test toolmarks made with the chisel marked #1 were examined and microscopically compared to the toolmarks on the paint lid marked #2 (with blue paint) with positive results (Identification). The chisel marked #1 made the toolmarks on the paint can lid marked #2. The test toolmarks made with the chisel marked #1 were examined and microscopically compared to the toolmarks on the paint lid #3 (with red paint). The results of the comparisons were inconclusive.
NAVUUM	Tool Mark Analysis: Methodology: Physical (Visual Examination) Microscopy (Stereo/Comparison Microscope) Digital Micrometer Item 1A, the test marks, was sealed in a manila envelope and will be returned with the evidence to the submitting agency. Test marks were made with Item 1, the chisel, using submitted testing media and laboratory standard media. The tool mark on Item 2, the blue marked paint lid, was made with Item 1, the chisel, based upon corresponding class and individual microscopic characteristics. The tool mark on Item 3, the red marked paint lid, was not made with Item 1, the chisel, based upon different class and individual microscopic characteristics.
NDV6QM	Tool Mark Analysis: Methodology: Physical (Visual Examination) Microscopy (Comparison Microscope) Digital Micrometer Test marks were made with Item 1, the chisel, using submitted/laboratory standard testing media. Item 1A, the test marks, was sealed in a manila envelope and will be returned with the evidence to the submitting agency. The tool mark on Item 2, the paint can lid, was made with Item 1, the chisel, based upon corresponding class and individual microscopic characteristics. The tool mark on Item 3, the paint can lid, was not made with Item 1, the chisel, based upon different class and individual microscopic characteristics.
NVFVPL	The questioned tool mark on the tin lid (Item 2) was made by the supplied cold chisel (Item 1). The questioned tool mark on the tin lid (Item 3) was not made by the supplied cold chisel (Item 1).
NZAMY4	EXAMINATIONS SHOWED ITEM 2 WAS MADE BY ITEM 1. EXAMINATIONS SHOWED ITEM 3 WAS

TABLE 2

WebCode	Conclusions
	NOT MADE BY ITEM 1.
P2ZBV6	Examinations showed that the toolmarks present on Item 2 were produced by Item 1. Examinations showed that the toolmarks present on Item 3 were not produced by Item 1.
PFDJUM	Microscopic examination and comparison reveal that the questioned toolmark on Item 1.A was made by the tool, Item 1.C based on agreement of class and individual characteristics. Microscopic examination and comparison reveal that the questioned toolmark on Item 1.B was not made by the tool, Item 1.C based on disagreement of class characteristics.
PH89E4	IDENTIFICATION: The following items were compared and were found to show the presence of matching features. The opinion of Identification is based upon the agreement of a combination of individual characteristics and all discernible class characteristics consistent with having been created by the same tool. Item 1 (test toolmarks from chisel) Item 2 ELIMINATION: Item 3 was compared to and can be ELIMINATED as having been made by Item 1 (chisel) based on differences in class characteristics.
PT26C6	1. Examination of Exhibit 1 revealed one MAYHEM brand 7 inches long ferromagnetic cold chisel. This tool is consistent with being used as a prying, scraping or striking type tool. Test standards of Exhibit 1 were created for microscopic comparison and were sub exhibited as 1.1. 2. Examination of Exhibits 2 and 3 revealed each is a non ferromagnetic aluminum paint can lid with a suitable toolmark approximately at the center of one side of the lid. These toolmarks are consistent to be caused by a tool designed to be used in a prying, scraping or striking mode such as those observed by a chisel, pry bar or a flat head (slotted) screwdriver. A cast of the toolmarks on Exhibits 2 and 3 were created and sub exhibited as 2.1 and 3.1, respectively. 3. The toolmarks on Exhibits 2 and 3 were microscopically compared with the test standards (Exhibit 1.1) created from Exhibit 1. The following results were concluded: a. The toolmark on Exhibit 2 was created by Exhibit 1 due to agreement sufficient agreement of individual characteristics. b. The toolmark on Exhibit 3 was not created by Exhibit 1 due to disagreement of class characteristics. The width of the tool working surface of the tool that created the toolmarks on Exhibit 3 is shorter than the one observed on Exhibit 1. 4. See photos for measurements. All measurements are approximate. [Photos not included.]
Q7MHT4	EVIDENCE SUBMITTED Lab Item # Agency Item # Description 1 T1 One (1) cardboard box containing: 1.1 T1 One (1) Mayhew brand 3/4" cold chisel. 1.2 T1 One (1) metal paint can lid. 1.3 T1 One (1) metal paint can lid. CONCLUSIONS OF ANALYSIS The toolmark, item 1.2, was identified as having been made by the chisel, item 1.1, based on the agreement of all discernible class characteristics and agreement of corresponding individual microscopic markings. The toolmark, item 1.3, was eliminated as having been made by the chisel, item 1.1, based on a difference in class characteristics (width of impression). [Participant submitted data in a format that could not be reproduced in this report].
Q8H2U6	Item 2 was identified as having been marked by Item 1 based on agreement of class characteristics, and individual characteristics observed within the marked surfaces (toolmarks). Item 3 was inconclusive (III) to Item 1.
Q9YXM6	The toolmarks present on Item 2 were examined microscopically and identified as having been produced by the Item 1 tool based on corresponding class and individual characteristics. The toolmarks present on Item 3 were examined microscopically and eliminated as having been produced by the Item 1 tool due to differences in class characteristics.
QCTYHR	1. The toolmark present on the paint can lid described in item 2 was produced by the cold chisel described in item 1 (Identification). 2. The toolmark present on the paint can lid described in item 3 was not produced by the cold chisel described in item 1 (Elimination).
QHYN2K	Test marks were made using both surfaces of the cold chisel (Item 1). These test marks were compared to the marks on Items 2 & 3 (paint can lids). It was determined that the marks on Item 2 were made by the cold chisel. It was further determined that the marks on Item 3 were not made by the cold chisel.
QPJQ9M	Test toolmarks were created using the Exhibit 1 chisel and designated Exhibits 1.1 and 1.2. The Exhibit 2 toolmark was identified as having been made by the Exhibit 1 chisel. The Exhibit 3 toolmark bears a prying/compression toolmark consistent with having been produced by a tool such as a chisel with a blade width of at least 0.734 inch. The Exhibit 3 toolmark could not be identified or excluded as having been made by the Exhibit 1 chisel based on an agreement of all discernible class

TABLE 2

WebCode	Conclusions
	characteristics and neither sufficient agreement nor sufficient disagreement of individual characteristics. The result of the comparison was inconclusive.
QXUK26	1. Exhibit 1 is a 3/4" metal chisel which is a single bladed tool which can be used in a cutting, stamping, or scraping action. a. Exhibit 1 was used to create the Exhibit 1.1 test standards. 2. Exhibits 2 and 3 are each a paint can lid with toolmark. a. Comparison revealed the toolmark on the Exhibit 2 paint can lid was made by Exhibit 1 based on sufficient agreement of class and individual characteristics. b. Comparison revealed the toolmark on the Exhibit 3 paint can lid was not made by Exhibit 1 based on disagreement of class characteristics. c. Exhibit 3 is consistent with having been made by a single blade tool used in a stamping and scraping action.
RBC3QR	Results of Examinations: Item 1 is a Mayhew USA brand 3/4 inch cold chisel, which can use a compression or scraping action. Items 2 and 3 are paint can lids which bear striated and impressed toolmarks produced by scraping and compression type tool actions. Toolmarks present on the Item 2 paint can lid were identified as having been produced by the Item 1 cold chisel. Toolmarks present on the Item 3 paint can lid were eliminated from having been produced by the Item 1 cold chisel, due to a difference in class characteristics.
REYYXH	The exhibit cold chisel (item 1) created the tool mark in the paint can lid that had been marked with blue paint (item 2). The exhibit cold chisel (item 1) did not create the tool mark in the paint can lid that had been marked with red paint (item 3).
RMA2JJ	2) There was an agreement of a combination of individual characteristics and all discernible class characteristics between the cold chisel, item 1 and the mark left in the top of the can marked as item 2 where the extent of agreement exceeds that which can occur in the comparison of toolmarks made by different tools and is consistent with the agreement demonstrated by toolmarks known to have been produced by the same tool. This is an identification result. There was a significant disagreement of discernible class characteristics and individual characteristics between the cold chisel, item 1 and the paint can lid, item 3. This is an elimination result.
RQNV22	Examination showed the tool mark present on Item 2 was created by Item 1. Examination showed the tool mark present on Item 3 was not created by Item 1.
RQTDZZ	Items 1-3 were examined. Toolmarks on Item 2 were microscopically compared to tests made with Item 1. The toolmarks on Item 2 were made by Item 1 based on the sufficient agreement of individual characteristics. Toolmarks on Item 3 were not made by Item 1 based on different class characteristics. The above analysis began on 03/04/2025.
RTWQ29	The toolmark on the paint can lid labeled with blue mark submitted in laboratory evidence item 1.2 was microscopically compared to test marks made with the chisel contained in laboratory evidence item 1.1 with the following results. The toolmark on laboratory evidence item 1.2 was identified as having been made with the chisel contained in laboratory evidence item 1.1. The toolmark on the paint can lid with red mark submitted in laboratory evidence item 1.3 was microscopically compared to test marks made with the chisel contained in laboratory evidence item 1.1 with the following results. The toolmark on laboratory evidence item 1.3 was eliminated as having been made with the chisel contained in laboratory evidence item 1.1.
RY6A68	The Item 1 chisel appears to be new with no significant wear and tear. Although the cutting edge of the blade appears to be sharp with some minor defects, the tool was determined to be functional as designed. The questioned toolmark on the Item 2 can was determined to have been caused by the Item 1 chisel. The questioned toolmark on the Item 3 can was determined as not having been caused by the Item 1 chisel.
TMKHT3	The toolmarks on item 2 paint can lid were produced with Item 1 cold chisel. The toolmarks on Item 3 paint can lid were not produced with the Item 1 cold chisel.
TRVFGP	In my opinion, the observed correspondence between the impression on the paint can lid, Item 2 and those produced with the submitted cold chisel, Item 1, conclusively demonstrates that Item 1 has been used to damage the paint can lid, Item 2. The impression on the paint can lid, Item 3 has not in my opinion been made using the cold chisel, Item 1.
TXNDC8	The toolmarks on the paint can lid, Lab Item 2, were identified as having been produced by the tool, Lab Item 1, based on agreement of class characteristics and corresponding individual detail using

TABLE 2

WebCode	Conclusions
	microscopic comparison. The toolmarks on the paint can lid, Lab Item 3, were eliminated from having been produced by the tool, Lab Item 1, based on disagreement of class characteristics using microscopic comparison.
UB7MCH	The toolmark on exhibit 2 (item 2) was identified as having been made by exhibit 1 (item 1), the submitted chisel. The toolmark on exhibit 3 (item 3) was not made by exhibit 1 (item 1), the submitted chisel, based on difference in class characteristics.
UGYPH3	#1.1, #1.2 Tests were made with the submitted chisel. These tests were compared microscopically with the toolmark on Item #1.2. There is agreement in all discernible class characteristics and sufficient agreement in corresponding individual characteristics for identification. Item #1.2 toolmark was made by the submitted chisel, Item #1.1. #1.3 The toolmark on the can lid is eliminated from being made by Item #1.1 based on differences in class characteristics.
UPQ8R6	Upon the examination, it is possible to conclude that the suspect's cold chisel (Item 1) did produce the questioned toolmarks on the submitted paint can lids (Item 2 and Item 3).
VLNN94	Q-1 (item 2) was made by K-1 (item 1). This conclusion was based on an agreement of all discernible class characteristics and sufficient agreement of individual characteristics. Q-2 (item 3) was not made by K-1 (item 1). This conclusion was based on a difference in class characteristics.
VUHT36	The instrument impression on Item 2 was found to show agreement in class characteristics, sub-class characteristics and individual characteristics with the submitted tool (Item 1) such that in my opinion, the tool is responsible for the impression. The impression on Item 3 was found to be different from the submitted tool such that the tool is not responsible for the impression
VXZV64	Toolmarks present on the Item 2 paint can lid were identified as having been produced by the Item 1 cold chisel. The Items 2 and 3 paint can lids were excluded as having been marked by the same tool. The Item 3 paint can lid was excluded as having been marked by the Item 1 cold chisel.
W9QHGY	1. Examination of Exhibit 1 revealed it to be consistent with being a ferromagnetic cold chisel bearing the Mayhew brand markings. Exhibit 1 is designed to cut through the appropriate medium in a prying action following the application of compression forces (hammer on handle). Exhibit 1 was used to create Exhibit 1.1 (Test Standards). Exhibit 1.1 was determined to be suitable for microscopic comparison. 2. Examination of Exhibits 2 and 3 revealed them to be two ferromagnetic metal discs consistent with being small paint can lids. Each exhibit displays a single area of damage (tool marks) on the exterior portion of its lid, consistent with having been caused by a prying action tool, such as a flathead screwdriver or chisel. The damage displayed on Exhibit 2 and Exhibit 3 were determined to be suitable for microscopic comparison. a. The damage displayed on Exhibit 2 consists of striated and impressed markings measuring 19.04 mm in width. b. The damage displayed on Exhibit 3 consists of striated and impressed markings, measuring 18.52 mm in width. 3. Exhibits 1.1, 2, and 3 were microscopically compared to one another. a. Due to sufficient agreement of individual characteristics, it was concluded that Exhibit 2 was damaged by Exhibit 1. b. Due to a disagreement of class characteristics, it was concluded that the damage on Exhibit 3 was not made by Exhibit 1. All measurements are approximate.
WEEULL	The questioned toolmark, Item 2 had similar class and individual characteristics to the toolmark produced by the suspect's cold chisel, Item 1. I concluded that the questioned toolmark, Item 2 was produced by the suspect's cold chisel, Item 1. The questioned toolmark, Item 3 had dissimilar class and individual characteristics to the toolmark produced by the suspect's cold chisel, Item 1. I concluded that the questioned toolmark, Item 3 was not produced by the suspect's cold chisel, Item 1.
WM9YEM	Results of Examinations: Item 1 is a Mayhew cold chisel that uses a scraping/prying action. Item 2 and Item 3 consist of two (2) paint can lids. Item 2 and Item 3 bear striated toolmarks of value that are physically consistent with toolmarks made by a scraping/prying action. The toolmark present on the Item 2 paint can lid was identified as having been produced by the Item 1 cold chisel. The toolmark present on the Item 3 paint can lid was excluded as having been made by the Item 1 cold chisel, due to a difference in class characteristics.
WTGFU3	[No Conclusions Reported.]
WWJ2ZM	Results of Examinations: Item 1 is a Mayhew manufactured cold chisel that uses a punching type action. Toolmarks present on the Item 2 paint can lid were identified as having been produced by the

TABLE 2

WebCode	Conclusions
	Item 1 chisel. Toolmarks present on the Item 3 paint can lid were excluded as having been created by the Item 1 chisel.
XFARFD	The toolmark on item 1-AB was identified as having been produced by item 1-AA based on sufficient agreement of the class and individual characteristics. The toolmark on item 1-AC was eliminated as having been produced by item 1-AA based on agreement of the class characteristics but sufficient disagreement of the individual characteristics. Item 1-AD was received and documented, but only used for lab generated evidence (test toolmarks produced with item 1-AA).
XQ7X9C	I compared the toolmarks present on the two paint can lids (item 2 and item 3) that were described as having come from a crime scene, with test-marks I had made using the cold chisel (item 1) that was described as having been recovered from a suspect. I found an excellent correspondence of size and shape and an excellent correspondence of microscopic detail between the toolmark in the paint lid, item 2 and the test-marks made using the cold chisel (item 1). Therefore, in my opinion, the cold chisel could have made the toolmark present on the paint can lid, item 2, or another tool with the same class features and that would create the same microscopic detail could have made this toolmark. In subjectively assessing the significance of the scientific findings, I have considered the probability of observing these comparison findings given the chisel (item 1) had made the toolmark in the paint can lid (item 2), as opposed to the probability of observing these comparison findings given a different tool had made this toolmark. In my opinion, the comparison findings provided extremely strong support to the proposition that the cold chisel, item 1, had made the toolmark in the paint can lid, item 2, as opposed to another tool. I have chosen the term 'extremely strong support' from the following scale: neutral, slight support, moderate support, strong support, very strong support, and extremely strong support. This scale can be used to indicate the level of support for either proposition. The toolmark present on the paint lid (item 3) had been made by a tool with a narrower blade than the cold chisel (item 1). Therefore, the cold chisel could not have made the toolmark in the paint can lid (item 3).
XXPYTV	A microscopic comparison was conducted between Test toolmarks #1-1 (A and B), which were produced by Item #1 and Items #2, and #3. The examinations determined Item #2 was produced by the Item #1 due to an agreement of individual characteristics. The examinations determined Item #3 was not produced by the Item #1 due to a disagreement of individual characteristics. All firearm comparison examinations were conducted using the AFTE's (Association of Firearm & Tool Mark Examiners) Theory of Identification. Identifications are the opinion of a qualified examiner that two tool marks were made by the same tool based on sufficient agreement of individual characteristics. The agreement of individual characteristics is of a quantity and quality that the likelihood another (different) tool could have made the mark is so remote as to be considered a practical impossibility. All exclusions and inconclusive findings were based upon exemplars available at the time of the examinations. [Name.]
YPVBBX	Item 1 consists of a cold chisel with a straight blade. Item 2 consists of a paint can lid bearing striated-type toolmarks which, based on sufficient correspondence of class and individual details, were identified as having been made by the cold chisel in Item 1. Item 3 consists of a paint can lid bearing striated-type toolmarks which exhibit sufficient differences in individual characteristics from marks produced by the cold chisel in Item 1 to eliminate the tool as the source of the striated-type marks in the Item 3 paint can lid.
YZPNBU	Examinations showed the tool marks on Item 2 were created by Item 1. Examinations showed the tool marks on Item 3 were not created by Item 1.
ZDQPFH	In my opinion the mark on Item 2 was made by Item 1 - CONCLUSIVE ASSOCIATION. In my opinion the mark on Item 3 was not made by Item 1 - CONCLUSIVE ELIMINATION.

Additional Comments

TABLE 3

WebCode	Additional Comments
2BMBDB	KEY: Item 1 is (Item 1.A). Item 2 is (Item 1.B). Item 3 is (Item 1.C). Item 4 is (Item 1.D).
3JV8QG	<p>Methods: Tool The type, action, and manufacturer of a tool are normally determined by directly observing the function and manufacturer markings on the tool in question. When these are not present, published materials and tool literature in the Firearms/Toolmarks Discipline reference library may be used to make determinations. When a microscopic comparison is necessary using a questioned tool, test samples are created using a test material that is softer or similar in quality to the item being compared. Pattern Examination Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are examined and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. Comparative examinations of the impressed and striated toolmarks, in at least two items, are conducted to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observed difference(s) in class characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Tool The results of tool examinations describe type and/or operating condition of the tool as it was received in the Firearms/Toolmarks Discipline. Pattern Examination Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variations in substrate, changes in tool working surfaces from wear, corrosion, subclass, damage, or the employment of unusual tool/work piece orientations, toolmark reproduction may be incomplete or insufficient, as a result it may not be possible for an examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes. [Participant submitted data in a format that could not be reproduced in this report.]</p>
99UTAQ	<p>Methods: Physical and Visual Examination Physical and visual examinations compare the observable features and class characteristics of evidence items. A conclusion of "physically consistent with" is reached if the observable features or measurable dimensions and/or design features of two items are in agreement or are "physically consistent." If these dimensions and features are clearly different, an elimination conclusion is reached. If there is a lack of observable features or measurable dimensions, the result is inconclusive. Pattern Examination Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are examined and compared. If the class characteristics of the toolmarks are not clearly</p>

TABLE 3

WebCode	Additional Comments
	<p>different, the examination moves to a second stage using comparative microscopy. Comparative examinations of the impressed and striated toolmarks, in at least two items, are conducted to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observed difference(s) in class characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Tool The type, action, and manufacturer of a tool are normally determined by directly observing the function and manufacturer markings on the tool in question. When these are not present, published materials and tool literature in the Firearms/Toolmarks Discipline reference library may be used to make determinations. When a microscopic comparison is necessary using a questioned tool, test samples are created using a test material that is softer or similar in quality to the item being compared. Limitations: Physical and Visual Examination A Physical and Visual examination is unsuitable for determining a source identification conclusion. A conclusion of "physically consistent with" signifies a restricted group source, based on class characteristics and/or observable features, from which evidence may have originated. Post-manufacture features cannot be used for elimination purposes. Pattern Examination Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variations in substrate, changes in tool working surfaces from wear, corrosion, subclass, damage, or the employment of unusual tool/work piece orientations, toolmark reproduction may be incomplete or insufficient, as a result it may not be possible for an examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes. Tool The results of tool examinations describe type and/or operating condition of the tool as it was received in the Firearms/Toolmarks Discipline. [Participant submitted data in a format that could not be reproduced in this report.]</p>
9LKK2L	I use internal LIMS numbers. The numbers are as follows: Item 01-01 = Agency Item 1 Item 01-02 = Agency Item 2 Item 01-03 = Agency Item 3
BF4Y3Y	The toolmark damage present in item 3 although potentially from the same brand chisel was approximately 0.7 mm shorter than the supplied cold chisel's blade length.
DMWQNX	Test markings were produced on the supplied paint can lids using the cold chisel, which was held at an approximate 45 degree angle to the surface. The resulting tool marks exhibited striations converging to a termination point corresponding to the cessation of the cutting action. These characteristics were consistent with the tool marks observed on the exhibit. Microscopic comparison examinations determined that the cold chisel was the source of the tool marks present on the exhibit paint can lid (Item 2), within the limits of practical certainty. Additionally, it was established that on the body of the chisel on the side of the cold chisel's cutting edge that made contact with the test paint can lid bore a

TABLE 3

WebCode	Additional Comments
DN79KH	<p>partial stamping reading "SAFETY GOGGLES SS." This same side, when applied at an angle, was responsible for imparting the tool mark on Item 2. The tool mark imparted to the exhibit paint can lid item 3 measured less in width to the test marks from Item 1. The narrower dimension of the apparent cutting edge that caused the mark on Item 3 and the lack of sufficient agreement observed between the individual characteristics of test markings and Item 3 contributed to the elimination.</p> <p>TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm/tool which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm/tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm/tool surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm/tool are not to the absolute exclusion of all other firearms/tools because it is not feasible to examine all possible firearms/tools. However, observing this amount of agreement from a different source is considered extremely remote.</p>
FXB3RF	<p>TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm or tool, which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm or tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm or tool surfaces. These random imperfections or irregularities can be either produced incidental to manufacture or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm or tool are not to the absolute exclusion of all other firearms or tools, because it is not feasible to examine all firearms or tools in the world. However, observing this amount of agreement between different sources is considered extremely remote.</p>
HP68MD	<p>Class characteristics are defined as measurable features of a firearm/tool which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm/tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm/tool surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm/tool are not to the absolute exclusion of all other firearms/tools because it is not feasible to examine all possible firearms/tools. However, observing this amount of agreement from a different source is considered extremely remote.</p>
HVTCLD	<p>Potential observed difference in tool width. However, due to toolmark depth and the substrate used for the testing, along with only (1) sample does not allow me to definitively conclude that there is a class characteristic difference. Furthermore, there are areas of agreement observed between the red colored test and the test toolmarks. The agreement may not have been sufficient for ID or exclusion, but the presence of even a small amount of agreement made it even more challenging to conclude an exclusion solely based on class width differences.</p>
HVXUHC	<p>Item 01-03 was microscopically compared to tests made using the Item 01-01 Mayhew chisel. It was observed that the overall length of the impressed mark on Item 01-03 was slightly smaller than the impressed marks on the tests made using Item 01-01. Some differences were also noted in the striated patterns between Item 01-03 and the tests made using Item 01-01. Although differences were observed, they were insufficient for elimination. The Item 01-01 Mayhew chisel could neither be identified nor eliminated as having struck the Item 01-03 paint can lid. There is agreement of all discernible class characteristics and disagreement of individual characteristics, but insufficient for an elimination.</p>
L7VKA3	<p>It is inconsistent that the strike/toolmark on the Paint Can Lid (Item #3) was produced from the Cold Chisel (Item #1). There was agreement of all discernible class characteristics and disagreement of some characteristics, but the disagreement was insufficient for exclusion. Note: unable to determine the width of the strike/toolmark on item #3 due to the strike/toolmark being slightly angled and no definitive "edge" on one side. Strike/toolmark #2 appeared to have visible edges on both sides.</p>
MD3RRB	<p>CTS item numbers are different than item numbers designated in conclusions above [refer to Table 2 - Conclusions] : CTS Item 1 (chisel) = Lab Item 1A CTS Item 2 (paint can lid with blue paint) = Lab Item 1B CTS Item 3 (paint can lid with red paint) = Lab Item 1C Reasoning behind inconclusive results: Item</p>

TABLE 3

WebCode	Additional Comments
	<p>1C is inconclusive as having been produced by Item 1A, both sides A and B. There is a small difference in width of 1C toolmark to Item 1A, but this difference is not sufficient for class elimination. Some of the 1A test toolmarks in lead appear closer in width to Item 1C toolmark than the 1A test toolmarks in paint can lids. Because of the variation in 1A test toolmark widths in different materials, the width difference is not sufficient for elimination. Some disagreement is observed in individual characteristics. This disagreement is not sufficient for elimination. Item 1C is inconclusive to Item 1B. There is a small difference in width of the two toolmarks, but this difference is not sufficient for class elimination. Some disagreement is observed in individual characteristics. This disagreement is not sufficient for elimination.</p>
N4RQ7A	Item 1B is Test Item 2. Item 1C is Test Item 3.
N9KPK6	#1 Toolmarks vs. #3 inconclusive, similar class. Test toolmarks cannot be identified or eliminated as having made the toolmarks.
PT26C6	<p>TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm/tool which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm/tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm/tool surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm/tool are not to the absolute exclusion of all other firearms/tools because it is not feasible to examine all possible firearms/tools. However, observing this amount of agreement from a different source is considered extremely remote</p>
Q8H2U6	<p>There was some difficulty in removing the residue/surface coating from the can lid that was dislodged by the toolmarking process. This made the comparison to Item 3 slightly more difficult. Elimination based on individual characteristics is to be used with extreme caution only, therefore, a conclusion of INC III was reached for Item 3. Inconclusive III: Agreement of all discernable class characteristics and disagreement of individual characteristics, but insufficient for an elimination</p>
QCTYHR	<p>1. Identification: Based on the agreement of individual characteristics observed by microscopic comparison examination. 2. Elimination: Based on disagreement of subclass and individual characteristics observed by microscopic comparison examination.</p>
QXUK26	<p>Class characteristics are defined as measurable features of a firearm or tool, which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm or tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm or tool surfaces. These random imperfections or irregularities can be either produced incidental to manufacture or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm or tool are not to the absolute exclusion of all other firearms or tools, because it is not feasible to examine all firearms or tools in the world. However, observing this amount of agreement between different sources is considered extremely remote.</p>
RBC3QR	<p>Methods: Tool The type, action, and manufacturer of a tool are normally determined by directly observing the function and manufacturer markings on the tool in question. When these are not present, published materials and tool literature in the Firearms/Toolmarks Discipline reference library may be used to make determinations. When a microscopic comparison is necessary using a questioned tool, test samples are created using a test material that is softer or similar in quality to the item being compared. Pattern Examination Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are examined and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. Comparative examinations of the impressed and striated toolmarks, in at least two items, are conducted to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observed difference(s) in class characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came</p>

TABLE 3

WebCode	Additional Comments
	<p>from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Tool The results of tool examinations describe type and/or operating condition of the tool as it was received in the Firearms/Toolmarks Discipline. Pattern Examination Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variations in substrate, changes in tool working surfaces from wear, corrosion, subclass, damage, or the employment of unusual tool/work piece orientations, toolmark reproduction may be incomplete or insufficient, as a result it may not be possible for an examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes. [Participant submitted data in a format that could not be reproduced in this report.]</p>
W9QHGY	<p>TECHNICAL NOTES: Class characteristics are defined as measurable features of a firearm/tool which indicate a restricted group source. They result from design features and are determined prior to manufacture of the firearm/tool. Individual characteristics are defined as marks produced by the random imperfections or irregularities of firearm/tool surfaces. These random imperfections or irregularities are produced incidental to manufacture and/or caused by use, corrosion, or damage, and are unique to that specific tool. Any conclusions indicating that a toolmark was made by a specific firearm/tool are not to the absolute exclusion of all other firearms/tools because it is not feasible to examine all possible firearms/tools. However, observing this amount of agreement from a different source is considered extremely remote.</p>
WM9YEM	<p>Methods: Tool The type, action, and manufacturer of a tool are normally determined by directly observing the function and manufacturer markings on the tool in question. When these are not present, published materials and tool literature in the Firearms/Toolmarks Discipline reference library may be used to make determinations. When a microscopic comparison is necessary using a questioned tool, test samples are created using a test material that is softer or similar in quality to the item being compared. Pattern Examination Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are examined and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. Comparative examinations of the impressed and striated toolmarks, in at least two items, are conducted to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observed difference(s) in class characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual</p>

TABLE 3

WebCode	Additional Comments
	<p>characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Tool The results of tool examinations describe type and/or operating condition of the tool as it was received in the Firearms/Toolmarks Discipline. Pattern Examination Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variations in substrate, changes in tool working surfaces from wear, corrosion, subclass, damage, or the employment of unusual tool/work piece orientations, toolmark reproduction may be incomplete or insufficient, as a result it may not be possible for an examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes. [Participant submitted data in a format that could not be reproduced in this report.]</p>
WWJ2ZM	<p>Methods: Tool The type, action, and manufacturer of a tool are normally determined by directly observing the function and manufacturer markings on the tool in question. When these are not present, published materials and tool literature in the Firearms/Toolmarks Discipline reference library may be used to make determinations. When a microscopic comparison is necessary using a questioned tool, test samples are created using a test material that is softer or similar in quality to the item being compared. Pattern Examination Toolmarks, whether they are present on evidence items or secondary evidence created in the Laboratory, undergo two stages of comparison. First, the class characteristics are examined and compared. If the class characteristics of the toolmarks are not clearly different, the examination moves to a second stage using comparative microscopy. Comparative examinations of the impressed and striated toolmarks, in at least two items, are conducted to determine if patterns of similarity exist. At the completion of these comparisons, one of the following three opinions is issued: 1) Source Exclusion Source exclusion is an Examiner's conclusion that two toolmarks did not originate from the same source. This conclusion is an Examiner's opinion that the observed difference(s) in class characteristics provides extremely strong support for the proposition that the two toolmarks came from different sources and extremely weak or no support for the proposition that the two toolmarks came from the same source. A source exclusion based on a minor difference in measured class characteristics requires a verification. 2) Source Identification Source identification is an Examiner's conclusion that two toolmarks originated from the same source. This conclusion is an Examiner's opinion that all observed class characteristics are in agreement and the quality and quantity of corresponding individual characteristics is such that the Examiner would not expect to find that same combination of individual characteristics repeated in another source. The basis for a source identification conclusion is an Examiner's opinion that the observed class characteristics and corresponding individual characteristics provide extremely strong support for the proposition that the two toolmarks originated from the same source and extremely weak support for the proposition that the two toolmarks originated from different sources. A source identification requires a verification and is the Examiner's opinion that the probability that the two toolmarks were made by different sources is so small that it is negligible. 3) Inconclusive Inconclusive is an Examiner's conclusion that all observed class characteristics are in agreement but there is insufficient quality and/or quantity of corresponding individual characteristics such that the Examiner is unable to identify or exclude the two toolmarks as having originated from the same source. This conclusion is an Examiner's opinion that there is an insufficient quality and/or quantity of individual characteristics to identify or exclude. Reasons for an inconclusive conclusion include the presence of microscopic similarity that is insufficient to form the conclusion of source identification, or a lack of any observed microscopic similarity. Limitations: Tool The results of tool examinations describe type and/or</p>

TABLE 3

WebCode	Additional Comments
XFARFD	<p>operating condition of the tool as it was received in the Firearms/Toolmarks Discipline. Pattern Examination Firearms/Toolmark Identification is an empirical science that relies on objective measurements and a subjective comparison of microscopic marks of value. Due to variations in substrate, changes in tool working surfaces from wear, corrosion, subclass, damage, or the employment of unusual tool/work piece orientations, toolmark reproduction may be incomplete or insufficient, as a result it may not be possible for an examiner to reach a source conclusion. Additionally, some tool manufacturing methods routinely produce working surfaces that leave limited microscopic marks of value. Damaged, corroded, or fragmented items may be of little or no value for comparison purposes. [Participant submitted data in a format that could not be reproduced in this report.]</p> <p>The objects inside the sealed white box were itemized and labeled as follows: --- 1-AA (bubble wrapped chisel marked "Item 1"). --- 1-AB (small paint can lid from envelope marked "Item 2") --- 1-AC (small paint can lid from envelope marked "Item 3") --- 1-AD (two (2) small unmarked paint can lids).</p>

-End of Report-
(Appendix may follow)

Test No. 25-5281: Toolmarks Examination

DATA MUST BE SUBMITTED BY **March 31, 2025, 11:59 p.m. EDT** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: PTNULJ

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 vandalism case. Two paint can lids were collected by investigators from the crime scene, each containing a questioned toolmark. A suspect was apprehended later that same day and a cold chisel was recovered from his possession. Investigators are requesting that you examine the toolmarks and determine if any were made using the suspect's cold chisel.

Please note the following:

-Item 2 and Item 3 paint can lids are individually packaged in labeled envelopes. It is suggested that when an item is removed, it is marked according to your laboratory's procedure.

-Be careful when handling the cold chisel, as the blade is sharp.

-The Item 2 and Item 3 paint can lids have been marked with paint according to their item numbers.

-Two paint can lids have been included for possible test marking purposes.

Items Submitted (Sample Pack T1):

Item 1: Cold chisel recovered from the suspect.

Item 2: Paint can lid recovered from the crime scene (marked with blue paint).

Item 3: Paint can lid recovered from the crime scene (marked with red paint).

1.) Were the questioned toolmarks on either of the paint can lids (Item 2 and Item 3) produced by the suspect's cold chisel (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"/>

*Should an item(s) be marked "Inconclusive", please document the reason in the Additional Comments section of this data sheet.

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

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

3.) Additional Comments

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

RELEASE OF DATA TO ACCREDITATION BODIES

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

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

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

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

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

ANAB Certificate No.

A2LA Certificate No.

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

Authorized Contact Person and Title

Laboratory Name

Location (City/State)