



## **Serial Number Restoration**

### **Test No. 19-5251 Summary Report**

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Each participant received a sample pack containing a piece of metal bar stock, which had been stamped with a six character serial number that was then obliterated. Also included was a piece of aluminum bar stock intended as a standard for the size, shape and positioning of the stamped characters. Participants were asked to restore the obliterated serial number and report their findings. Data were returned from 200 participants and are compiled into the following tables:

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

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

# **Manufacturer's Information**

Each sample set consisted of a piece of steel bar stock that contained an obliterated serial number (Item 1) and a piece of aluminum bar stock intended as a standard for the size, shape, and positioning of the stamped digits. Participants were requested to attempt to restore the obliterated serial number utilizing their laboratory restoration methodologies and report the recovered serial number. The serial number to be restored consisted of 6 characters (5F3C7K).

## **SAMPLE PREPARATION:**

Each sample set contained a piece of steel bar stock that was stamped with 6 characters (5F3C7K). The serial number was then obliterated by a milling machine.

A piece of aluminum bar stock was also included in the sample as a reference standard. The alphanumeric characters provided are digits 0-9 and letters A-F, H, J, K and N.

## **SAMPLE SET ASSEMBLY:**

Each Item 1 bar stock and aluminum standard bar stock were separately enclosed in chip board, with the sides taped for security and then placed in their respective pre-labeled envelopes. Every sample pack was packaged to contain an Item 1 and aluminum standard. This process was repeated until all of the sample packs were prepared. Once verification was completed, all sample packs were sealed with a piece of evidence tape and initialed "CTS."

## **VERIFICATION:**

All three predistribution laboratories restored the obliterated six character serial number and reported "5F3C7K". Two laboratories used chemical restoration methods and one laboratory used a magnetic restoration method.

## **Summary Comments**

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This test was designed to allow participants to assess their proficiency in the restoration of an obliterated serial number. Participants were provided with a piece of metal bar stock that contained an obliterated serial number (Item 1) and a piece of aluminum bar stock intended as a standard for the size, shape and positioning of the stamped characters. Participants were requested to restore the obliterated serial number utilizing their laboratory recovery methodologies and report the recovered serial number. The serial number to be restored consisted of 6 characters (5F3C7K). (Refer to Manufacturer's Information for preparation details.)

Of the 200 responding participants in Table 1 (Recovered Characters), 197 (99%) restored the six characters consistent with the Manufacturer's Information. One participant restored five of the six characters, one participant restored four of the six characters, and one participant restored characters that were inconsistent with those reported in the Manufacturer's Information.

In Table 3 (Sample Preparation), the majority of participants used polishing, sanding, or visual methods to prepare their sample. In Table 4 (Recovery Methods), the majority of participants used chemical processing for the serial number restoration. However, it was noted that there were many laboratories that used both chemical and magnetic restoration methods.

# Recovered Characters

Please record the recovered characters below.

TABLE 1

Recovered Characters						
WebCode	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
23V8UV	5	F	3	C	7	K
27YX3V	5	F	3	C	7	K
2AZWKF	5	F	3	C	7	K
2EPLR7	5	F	3	C	7	K
32737H	5	F	3	C	7	K
32XAYU	5	F	3	C	7	K
3C3AKE	5	F	3	C	7	K
3CYLBM	5	F	3	C	7	K
3N9EJT	5	F	3	C	7	K
3PBXTB	5	F	3	C	7	K
3QKXYH	5	F	3	C	7	K
3UKD3Z	5	F	3	C	7	K
4A9VL3	5	F	3	C	7	K
4AQQ6P	5	F	3	C	7	K
4CM9HC	5	F	3	C	7	K
4CTUQK	5	F	3	C	7	K
4CY6MG	5	F	3	C	7	K
4CYWQQ	5	F	3	C	7	K
4RLJQM	5	F	3	C	7	K
4T3QXQ	5	F	3	C	7	K
62TP9W	5	F	3	C	7	K
64HUUN	5	F	3	C	7	K
69PFMR	5	F	3	C	7	K
6AJ42G	5	F	3	C	7	K
6MWA93	5	F	3	C	7	K
6VPHTT	5	F	3	C	7	K
6WD2NY	5	F	3	C	7	K
72Q7VT	5	F	3	C	7	K

TABLE 1

Recovered Characters						
WebCode	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
76EN8C	5	F	3	C	7	K
796Y7P	5	F	3	C	7	K
7AF2TM	5	F	3	C	7	K
7DL9M2	5	F	C	3	7	K
7HCXCJ	5	F	3	C	7	K
7MB76U	5	F	3	C	7	K
82JHRK	5	F	3	C	7	K
89JZ7W	5	F	3	C	7	K
8ETYZB	5	F	3	C	7	K
8HXTTD	5	F	3	C	7	K
8MM4TC	5	F	3	C	7	K
8PFYR7	5	F	3	C	7	K
92XC3E	5	F	3	C	7	K
97B3GL	5	F	3	C	7	K
9FLDYD	5	F	3	C	7	K
9GV669	5	F	3	C	7	K
9HNCXJ	5	F	3	C	7	K
9Q6WAW	5	F	3	C	7	K
A62B96	5	F	3	C	7	K
A63YVB	5	F	3	C	7	K
AGRZ7P	5	F	3	C	7	K
AJFHZV	5	F	3	C	7	K
ANXRG9	5	F	3	C	7	K
AW87E4	5	F	3	C	7	K
BB223U	5	F	3	C	7	K
BLYX4W	5	F	3	C	7	K
BRYLCN	5	F	3	C	7	K
BUXFPZ	5	F	3	C	7	K
BW32G7	5	F	3	C	7	K
BW8FU8	5	F	3	C	7	K

TABLE 1

Recovered Characters						
WebCode	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
BWYMMH	5	F	3	C	7	K
CCRM9Q	5	F	3	C	7	K
CWTKMC	5	F	3	C	7	K
D8P67G	5	F	3	C	7	K
D8XXD6	5	F	3	C	7	K
DA3GKD	5	F	3	C	7	K
DDXD2R	5	F	3	C	7	K
DEQKU3	5	F	3	C	7	K
DGXNWR	5	F	3	C	7	K
DM62UP	5	F	3	C	7	K
DNX2L9	5	F	3	C	7	K
DPAUKH	5	F	3	C	7	K
DR2UVZ	5	F	3	C	7	K
DWRA4E	5	F	3	C	7	K
E2Y7CL	5	F	3	C	7	K
E79B4L	5	F	3	C	7	K
ECFWVP	5	F	3	C	7	K
ECZHNE	5	F	3	C	7	K
EM3QCR	5	F	3	C	7	K
EP2A8Y	5	F	3	C	7	K
EP6PMK	5	F	3	C	7	K
EQ2AAJ	5	F	3	C	7	K
EQ4TK2	5	F	3	C	7	K
EWU3UZ	5	F	3	C	7	K
EXHVBB	5	F	3	C	7	K
F2BDPE	5	F	3	C	7	K
F4KEUL	5	F	3	C	7	K
FAD8GM	5	F	3	C	7	K
FB2QCT	5	F	3	C	7	K
FCUQ4C	5	F	3	C	7	K

TABLE 1

Recovered Characters						
WebCode	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
FVBPGM	5	F	3	C	7	K
FVRREM	5	F	3	C	7	K
GA8J8L	5	F	3	C	7	K
GALN2D	5	F	3	C	7	K
GB4PWT	5	F	3	C	7	K
GFD76G	5	F	3	C	7	K
GMX7LU	5	F	3	C	7	K
GN6GHX	5	F	3	C	7	K
GNBT39	5	F	3	C	7	K
GURCEV	5	F	3	C	7	K
GWZHZW	5	F	3	C	7	K
HAFX6F	5	F	3	C	7	K
HAHLTK	5	F	3	C	7	K
HDM6ZT	5	F	3	C	7	K
HLB3HL	5	F	3	C	7	K
HWUME4	5	F	3	C	7	K
JHELX6	5	F	3	C	7	K
JJM3NN	5	F	3	C	7	K
JLBB27	5	F	3	C	7	K
K2Y9F7	5	F	3	C	7	K
K2ZW4B	5	F	3	C	7	K
K46QE2	5	F	3	C	7	K
K7DW3N	5	F	3	C	7	K
K94X8C	5	F	3	C	7	K
KHLJBK	5	F	3	C	7	K
KHQWYG	5	F	3	C	7	K
KLNDDB	5	F	3	C	7	K
KVFPJJ	5	F	3	C	7	K
KVWUZW	5	F	3	C	7	K
KW8WMV	5	F	3	C	7	K

TABLE 1

Recovered Characters						
WebCode	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
KWAPE2	5	F	3	C	7	K
L47HMV	5	F	3	C	7	K
LB69TD	5	F	3	C	7	K
LGTWHH	5	F	3	C	7	K
LJKVWF	5	F	3	C	7	K
LMCBU2	5	F	3	C	7	K
LUZZPX	5	F	3	C	7	K
M379NA	5	F	3	C	7	K
M3NX8Q	5	F	3	C	7	K
M9BYY3	5	F	3	C	7	K
MG3FRD	5	F	3	C	7	K
MHGWNW8	5	F	3	C	7	K
MKZ3Z8	5	F	3	C	7	K
MLHTKD	5	F	3	C	7	K
MNMF8Q	5	F	3	C	7	K
MUB6L9	5	F	3	C	7	K
MVMUVD	5	F	3	C	7	K
N6R7V2	5	F	3	C	7	K
N8ZHD3	5	F	3	C	7	K
NAQJJQ	5	F	3	C	7	K
PA734N	5	F	3	C	7	K
PDYADJ	5	F	3	C	7	K
PFQ9RH	5	F	3	C	7	K
PHZ9WP	5	F	3	C	7	K
PU3UNT	5	F	3	C	7	K
Q4MNFF	5	F	3	C	7	K
QCGT9G	5	F	3	C	7	K
QDZG2W	5	F	3	C	7	K
QK8CMP	5	F	3	C	7	K
QRT8QE	5	F	3	C	7	K



TABLE 1

Recovered Characters						
WebCode	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
QWHRM3	5	F	3	C	7	K
QWNUN9	5	F	3	C	7	K
R2VPYW	5	F	3	C	7	K
RAPURX	5	F	3	C	7	K
RHNJKM	5	F	3	C	7	K
RMC848	5	F	3	C	7	K
RMU9VF	5	F	3	C	7	K
RN7UHW	5	F	3	C	7	K
RTKMDV	5	F	3	C	7	K
RUCLUE	5	F	3	C	7	K
RUR3MM	5	F	3	C	7	K
T4HRCN	5	F	3	C	7	K
TB7AWQ	5	F	3	C	7	K
TBEHQJ	5	F	3	C	7	K
TBYGP3	5	F	3	C	7	K
TW2EDN	5	F	3	C	7	K
TYRDRM	5	F	3	C	7	K
U2NLVW	5	F	3	C	7	K
U4C48E	5	F	3	C	7	K
ULDV24	5	F	3	C	7	K
UPEPA7	5	F	3	C	7	K
UUTLWV	5	F	3	C	7	K
UWKV3	5	F	3	C	7	K
V4AKVC	5	F	3	C	7	K
VA3NWF	5	F	3	C	7	K
VKC8DX	3	E	4	2	B	8
VPDER9	5	F	3	C	7	K
VUKTP7	5	F	3	C	7	K
VXJBKD	5	F	3	C	7	K
W3DMZA	5	F	3	C	7	K

TABLE 1

Recovered Characters						
WebCode	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
W48BEY	5	F	3	C	7	K
W7UUFW	5	F	3	C	7	K
W8CMRR	5	F	3	C	7	K
W9ZE6H	5	F	3	C	7	K
WB2F8Z	5	F	3	C	7	K
WB8RTB	5	F	3	C	7	K
WFVG8U	5	F	3	C	7	K
WHMFLR	5	F	3	C	7	K
WKDE2B	5	F	3	C	7	K
WU2DQV	5	F	3	C	7	K
WVGHEL	5	F	3	C	7	K
XMFVUY	5	F	3	C	7	K
XTH4Y7	5	F	3	C	7	K
Y4ECD3	5	1	3	C	7	K
YFTAFL	5	F	3	C	7	K
YLX2R4	5	F	3	C	7	K
YV6VUA	5	F	3	C	7	K
YYNYCE	5	F	3	C	7	K
Z27JWA	5	F	3	C	7	K
Z4WQ8X	5	F	3	C	7	K
ZM46HX	5	F	3	C	7	K
ZQ8QLX	5	F	3	C	7	K

Response Summary						Participants: 200
	Character 1	Character 2	Character 3	Character 4	Character 5	Character 6
Consensus	5	F	3	C	7	K
Number	199	198	198	198	199	199
Percent	99.5%	99.0%	99.0%	99.0%	99.5%	99.5%

# Conclusions

TABLE 2

WebCode	Conclusions
23V8UV	The obliterated area was treated with a chemical etching solution and the characters '5F3C7K' were visualised.
27YX3V	Examination of Item #1 revealed an obliterated area. Standard serial number restoration techniques revealed the following characters"5F3C7K"
2AZWKF	Using standard laboratory techniques the obliterated serial number on Item 1-1 was restored to read 5F3C7K.
2EPLR7	The serial number 5F3C7K was recovered through out Fry's Reagent in the steel bar stock 303, it doesn't present alteration.
32737H	The obliterated area was treated using mechanical and chemical methods. The restored serial number was determined to be 5F3C7K.
32XAYU	The Exhibit's surface was lightly polished, using grinding paper 120 and 600. The polished surface was then treated with Fry's reagent. The results were successfully photographed.
3C3AKE	The following findings reflect the professional opinion of the examiner authoring this report. Examination of Item 1 revealed one (1) metal bar stock with suspected obliterated serial number. Using standard serial number restoration techniques, an attempt was made to restore the serial number with the following results: Serial Number: 5 F 3 C 7 K was restored on Item 1.
3CYLBM	ITEM 1: ONE PIECE OF 303 STAINLESS STEEL BAR STOCK WITH SUSPECTED OBLITERATED SERIAL NUMBER, MARKED "Q1". ITEM 1 (Q1) SERIAL NUMBER "5F3C7K" WAS FULLY RESTORED USING POLISHING METHOD AND ACID ETCHING SOLUTIONS (REFER TO PAGE 2 [Table 3: Sample Preparation and Table 4: Recovery Methods]).
3N9EJT	MAGNAFLUX UTILISED ONLY
3PBXTB	The obliterated serial number on the stainless steel bar stock, item 1, was restored to 5F3C7K. The stainless steel bar stock, item 1, was examined. The location of the suspected obliterated serial number, the middle of the bar stock, was obliterated by a grinding type of tool. Using standard restoration techniques, the obliterated area was treated with magnetic inspection particles.
3QKXYH	Item 1 was received with a possible obliterated serial number. The serial number has been restored using polishing and chemical processes. The serial number is 5F3C7K.
3UKD3Z	Serial number restored to read 5F3C7K.
4A9VL3	ITEM Q-1: ONE (1) SILVER METAL BAR MEASURING 2 5/8" X 1" X 1/4" DISPLAYING A MILLED OUT SECTION MEASURING 1" X 1". SERIAL NUMBER "5F3C7K" RECOVERED BY CHEMICAL ETCHING. ITEM MARKED "19-5251 [Participant Code]" BY EXAMINER.
4AQQ6P	Lab Item 1 / Restoration Results / 5F3C7K
4CM9HC	The serial number on the bar stock Item 1 had be removed by a milling type machine. An examination showed the serial number to be 5F3C7K.
4CTUQK	The serial number was chemically processed and restored to read: 5F3C7K
4CY6MG	The serial number located on the surface of the stainless steel block was observed to have been completely obliterated. In an attempt to restore the characters, polishing and chemical etching procedures were performed. The following serial number was revealed: "5 F 3 C 7 K".
4CYWQQ	Item #1 : Recovered characters : 5F3C7K
4RLJQM	Standard restoration techniques revealed the following characters "5F3C7K."
4T3QXQ	Serial Number Restoration Lab Item(s)# Restoration Results 1 5F3C7K

TABLE 2

WebCode	Conclusions
62TP9W	Results 5F3C7K
64HUUN	Using magnetic and chemical methods, the serial number on Item 001 was restored to read 5F3C7K.
69PFMR	In preparation for the application of acid, the area/location of the serial number on Item 1.01 was sanded and polished. Upon applying Davis Reagent, Turners Reagent and Fry's Reagent the serial number was observed to be 5F3C7K.
6AJ42G	After application of the electro-magnetic and Fry's process, we determined the serial number of the material bar stock as 5F3C7K.
6MWA93	Item 1 - One piece of metal bar stock. The submitted specimen marked as Item 1 was examined and identified as a metal bar stock with a suspected obliterated serial number. The obliterated serial number was chemically processed and successfully restored to read:"5F3C7K".
6VPHTT	The obliterated serial number of the steel bar stock (Item 1) was chemically restored and determined to be 5F3C7K. No E-Trace was run on the restored serial number.
6WD2NY	Item Q-1: is one (1) rectangular piece of aluminum bar stock, measuring approximately 2-7/8" x 1" and weighing approximately 1269 grains. Submitted in small tan envelope labeled "Item 1, Test#19-5251. CTS#19-5251 "[participant code]" was etched on back side, by examiner, for identification purposes. Serial number defaced by circular abrasions. Serial number restored using laboratory methods and reads: 5F3C7K.
72Q7VT	The obliterated area on the piece of 303 stainless steel bar stock in item 1 was chemically etched and the serial number was determined to be 5F3C7K.
76EN8C	The serial number was restored to read: 5 F 3 C 7 K
796Y7P	Examination of Item 1 revealed an obliterated area. Standard restoration techniques revealed the following characters "5F3C7K".
7AF2TM	Obliterated area on Item #1 restored as 5F3C7K.
7DL9M2	As a result of an attempted obliterated number restoration the following characters were observed: 5FC37K
7HCXCJ	[No Conclusions Reported.]
7MB76U	There was an obliterated area on Item #1. Standard restoration techniques revealed the following characters: "5F3C7K".
82JHRK	Standard restoration techniques revealed the following characters on Item #1: 5F3C7K.
89JZ7W	The restored Serial number is: 5 F 3 C 7 K.
8ETYZB	Restoration of obliterated stamped markings was performed on the questioned surface of the Item 1, and the restored serial number was found to be "5F3C7K".
8HXTTD	The serial number of item #1 was processed using mechanical polishing and chemical etching. The serial number was restored and determined to be "5 F 3 C 7 K"
8MM4TC	The obliterated area of the specimen was chemically processed and restored to read: 5F3C7K.
8PFYR7	The serial number was restored and read 5 F 3 C 7 K.
92XC3E	Item #1 is a 303 stainless steel bar stock, serial number obliterated. The obliterated serial number is located in the center of the bar stock. Acid etching procedures were performed and it was determined that the serial number was restored to read 5F3C7K.
97B3GL	Examination revealed an area of obliteration. Standard restoration techniques applied to this area revealed the following characters: 5F3C7K

TABLE 2

WebCode	Conclusions
9FLDYD	Chemical etching techniques were used to restore the obliterated serial number on the submitted metal block, item 1, to "5F3C7K".
9GV669	The serial number of the Item 01-01 bar stock was restored to read, "5F3C7K."
9HNCXJ	The item submitted had an area of obliteration. After restoration, the characters 5F3C7K were restored.
9Q6WAW	The obliterated serial number, located in the middle of the stainless steel bar stock, was chemically processed. Attempts to restore the obliterated serial number were successful. The restored serial number is "5F3C7K". The serial number was verified by [Name] of the [Laboratory].
A62B96	The serial number on the metal bar (Agency Item 1) was fully restored to be 5F3C7K.
A63YVB	The serial number has been restored to read: 5 F 3 C 7 K.
AGRZ7P	Restoration Results: 5F3C7K
AJFHZV	Q-1, ONE (1) PIECE OF STEEL (APPROX. 2 5/8" x 1" x 1/4") SUBMITTED WITH A SUSPECTED OBLITERATED SERIAL NUMBER. A ONE INCH SQUARE AREA OF SURFACE REMOVED BY A DRILLED/CUTTING DEVICE. SERIAL NUMBER "5F3C7K" RESTORED USING MAGNETIC PARTIAL INSPECTION PROCESS (MPI) & CHEMICAL ETCHING RESTORATION, SCRIBED WITH NUMBER "19-5251" BY EXAMINER.
ANXRG9	The serial number was restored to read as follows: 5 F 3 C 7 K.
AW87E4	The serial number on the bar stock was restored to read 5F3C7K.
BB223U	Examination of Item 1 revealed the existence of traces of characters located on the center of one of the flat sides engraved and erased by mechanical means, the restored number is 5F3C7K.
BLYX4W	The steel bar (Item 1) was physically and chemically processed. Its number was restored to read: 5F3C7K.
BRYLCN	Chemical restoration performed on Item #1 revealed the characters 5F3C7K.
BUXFPZ	Examinations showed the serial number of Item 1 to be obliterated. The serial number was restored using mechanical polishing and chemical etching techniques and was found to be: 5F3C7K.
BW32G7	The serial number of Submission 001 as restored is 5F3C7K.
BW8FU8	Examination of the submitted stainless steel bar stock found the manufacturer's original serial number to have been obliterated. Physical and magnetic processing of the stainless steel bar stock restored the obliterated, original serial number to read "5F3C7K".
BWYMMH	Lab Item(s)# 1 Restoration Results 5F3C7K
CCRM9Q	The serial number was restored using MagnaFlux.
CWTKMC	Item #1 is a piece of 303 stainless steel bar stock with suspected obliterated serial number. The obliterated serial number is located in the center of the bar stock. Dremel and acid etching procedures were performed and the serial number was restored to read 5F3C7K.
D8P67G	Item 1 Restoration results: 5F3C7K
D8XXD6	Using standard laboratory techniques, the Item 1-1 obliterated serial number was restored to read: 5F3C7K.
DA3GKD	Examination of the submitted bar stock found the manufacturer's serial number to have been obliterated. Physical and chemical processing of the submitted bar stock restored the obliterated, original serial number to read "5F3C7K".

TABLE 2

WebCode	Conclusions
DDXD2R	Examination and magnetic processing of the Q-1 bar stock restored the original obliterated serial number which was determined to be '5F3C7K'.
DEQKU3	The serial number on Item 001 was found to be obliterated. The obliterated serial number was chemically processed and the serial number was able to be restored as 5F3C7K.
DGXNWR	RESULTS OF EXAMINATION: Serial Number Restoration Results: Examination and magnetic processing of the Q-1 steel bar restored the original obliterated serial number which was determined to be '5F3C7K'.
DM62UP	Item #1: One piece of steel bar stock with an obliterated serial number. Findings: Examination of Item #1 revealed an obliterated area on one side of the piece of steel bar stock. Standard serial number restoration techniques revealed the following characters "5F3C7K".
DNX2L9	After application of the electro-magnetic method, we determined the serial number of the material bar stock as 5F3C7K.
DPAUKH	Physical and chemical treatment of the obliterated area on CTS Item 1 revealed the following number: 5F3C7K.
DR2UVZ	As a result of the serial number restoration method (Chemical) performed on the sample (Item 1), the following alphanumeric characters were recovered and observed: 5F3C7K. These appeared to be similar/consistent with the standard provided as reference.
DWRA4E	Using standard laboratory restoration techniques, the obliterated serial number on Item 1 was restored to read 5F3C7K.
E2Y7CL	[No Conclusions Reported.]
E79B4L	Restoration Results: 5F3C7K
ECFWVP	Item #1 was received with a suspected obliterated serial number. Attempts to restore the serial number with polishing and chemical processing successfully restored the serial number to read, "5F3C7K".
ECZHNE	Examination of the bar stock in Item #1 revealed an obliterated area. Standard restoration techniques revealed the characters 5F3C7K.
EM3QCR	Q-1 IS ONE SILVER METAL OBJECT (MO-1), CONSISTENT WITH FERROUS METAL BAR STOCK. SERIAL NUMBER OBLITERATED BY AN UNKNOWN METHOD, BUT MO-1 DISPLAYS DEEP MILLING MARKS ON OBLITERATED AREA. SERIAL NUMBER RESTORED USING A COMBINATION OF POLISHING AND THE CHEMICAL ETCHING METHOD. SERIAL NUMBER OF 5F3C7K SUCCESSFULLY RECOVERED. MO-1 MARKED WITH CASE NUMBER "19-5251" FOR IDENTIFICATION.
EP2A8Y	Fry's and Turner's reagents were used. After applying of three cycles obliterated number could be able to visualized.
EP6PMK	Chemical restoration techniques were applied to item #1 and the original serial number was restored as 5F3C7K.
EQ2AAJ	The obliterated area on the piece of 303 stainless steel bar stock in item 1 was chemically etched and the serial number was determined to be 5F3C7K.
EQ4TK2	Item #1 (~steel bar stock with suspected obliterated serial number) was examined on 8/15/2019 and found to contain an area of obliteration with overlapping circular signatures. Serial Number Restoration commenced and was completed on 8/15/2019. Serial Number Restoration was successful. The serial number on Item #1 (bar-stock) was recovered as: 5 F 3 C 7 K.
EWU3UZ	The obliterated serial number on item A1-1 was restored and found to be 5-F-3-C-7-K.
EXHVBB	I restored the obliterated area to read 5F3C7K.

TABLE 2

WebCode	Conclusions
F2BDPE	The serial number on the piece of stainless steel bar stock in item 1 was determined to be 5F3C7K.
F4KEUL	The serial number from item 1 was restored to be 5F3C7K
FAD8GM	Serial number restoration was performed on Item #1 and the following characters were restored "5F3C7K"
FB2QCT	The defaced serial number of the stainless steel bar, Item 1, was physically, magnetically and chemically processed to read: 5 F 3 C 7 K.
FCUQ4C	The serial number restoration on steel block was fully restore from (Item 1) to read: 5F3C7k
FVBPGM	A six digit alphanumeric serial number was successfully restored by chemical treatment to read: 5 F 3 C 7 K
FVRREM	Visual inspection of the Item 1 steel bar revealed a milled area on one of the broad faces. The defaced area on the Item 1 steel bar was magnetically processed, resulting in a full recovery of the Item 1 serial number. The recovered number reads as follows: 5F3C7K.
GA8J8L	Examination of Item 1 revealed an obliterated area in the center of the Item. Standard restoration techniques revealed the following characters: 5F3C7K
GALN2D	CONCLUSIONS: 1) The obliterated serial number of Item 1 was restored by acid etching techniques and was found to be: 5F3C7K.
GB4PWT	Using standard laboratory physical techniques, the serial number on Item #1 was recovered to read 5F3C7K.
GFD76G	Restoration results: 5F3C7K
GMX7LU	Using physical restoration techniques, the obliterated serial number on Item 1 was restored to read 5 F 3 C 7 K.
GN6GHX	The number was restored to read 5F3C7K
GNBT39	Examination of the submitted stainless steel bar stock found the manufacturer's serial number to have been obliterated. Magnetic processing of the stainless steel bar stock restored the obliterated, original serial number to read "5F3C7K".
GURCEV	1. Examinations showed the serial number of Item 1 to be obliterated. The serial number was restored using magnetic particle inspection and chemical etching techniques and was found to be: 5F3C7K.
GWZHZW	The general appearance of the middle part of the metal bar with suspected obliterated serial number in item 1 indicated that the original serial number had been ground away. After the restoration, the original serial number was found to be "5F3C7K".
HAFX6F	This serial number was restored by using magneto-optical and chemical etching methods. On Item 1 a string of 6 characters was restored: "5F3C7K".
HAHLTK	An examination of the steel bar in Item #1 revealed an obliterated area. The application of standard serial number restoration techniques were used to reveal the following characters "5F3C7K".
HDM6ZT	Using magnetic particle and physical restoration techniques, the obliterated serial number on Item 1 was restored to read "5F3C7K".
HLB3HL	Serial number was recovered by using the chemical etching method.
HWUME4	Prepared the surface of item 1 and applies nondestructive method of MAGNAFLUX, obtained the alphanumeric characters 5F3C7K.
JHELX6	Exhibit 1 contains one ferromagnetic metal bar with approximate dimensions of 67.11mm x 25.38mm x 6.40mm. An approximately 25.50mm wide obliterated area was observed on the bar. Standard restoration techniques revealed the following characters: 5F3C7K

TABLE 2

WebCode	Conclusions
JJM3NN	Using physical, magnetic, and chemical laboratory restoration techniques, the obliterated serial number on Item 1 was restored to read 5F3C7K.
JLBB27	Item #1 is a piece of 303 stainless steel bar stock, serial number obliterated. The obliterated serial number is located in the center of the bar stock. Acid etching procedures were performed and the serial number was restored to read 5F3C7K.
K2Y9F7	As a result of physical and chemical examinations to determine the unreadable serial number; It is concluded that the serial number consists of letters and numbers of "5F3C7K"
K2ZW4B	Attempts to restore the obliterated serial number on the piece of stainless steel bar stock, Item 1, were successful. The restored serial number is 5F3C7K.
K46QE2	Item # 1.001 (1) is a piece of 303 stainless steel bar stock, serial number obliterated. The obliterated serial number is located on the front side of the bar. Dremel polishing and acid etching procedures were performed and it was determined that the obliterated serial number was restored to read 5F3C7K.
K7DW3N	The obliterated serial number has been restored by using acid.
K94X8C	The obliterated serial number on Item 1 was restored and interpreted as "5F3C7K".
KHLJBK	The second mark has very uneven impression and it took longer to identify certain areas. It seems that the punch has been kept oblique when embossed.
KHQWYG	Restoration results: 5F3C7K
KLNDBB	Standard serial number restoration techniques revealed the following characters, "5F3C7K".
KVFPJ	The obliterated serial number was restored to read "5F3C7K".
KVVUZW	The serial number of this bar stock was restored and determined to be 5F3C7K.
KW8WMV	The serial number for Item 19-5251-1 was restored to read: 5F3C7K.
KWAPE2	1) The obliterated area on Exhibit 1 (Metal Bar) was visually examined, magnetically processed, and chemically processed. The characters were restored and appeared as follows: 5 F 3 C 7 K.
L47HMV	Forensic restoration procedures were applied to the milled area in an attempt to restore any possible obliterated characters. A series of six previously stamped characters were restored and read: 5F3C7K.
LB69TD	Examination of Item #1 revealed an obliterated area. Standard restoration techniques revealed the characters "5F3C7K".
LGTWHH	The Item #1 bar stock was physically and chemically processed. Its serial number was restored to read: 5 F 3 C 7 K. The evidence will be returned to the submitter.
LJKVWF	The obliterated serial number of laboratory evidence item 1 was chemically restored with the following results obtained. The restored serial number is 5F3C7K.
LMCBU2	THE SURFACE OF Q1 (ITEM 1) METAL BAR STOCK WAS POLISHED TO PREPARE IT FOR MAGNETIC AND CHEMICAL RESTORATION. THE NUMBER RESTORED BY THE SERIAL NUMBER RESTORATION PROCESS READS: 5F3C7K
LUZZPX	The metal block in item 1 was examined, polished and chemical restoration techniques revealed the number: 5F3C7K. No analysis was conducted on the submitted standard.
M379NA	5F3C7K
M3NX8Q	Examination, of the obliterated serial on the Item 1 stainless steel bar stock, was found to be "5F3C7K".



TABLE 2

WebCode	Conclusions
M9BYY3	Examination of the piece of metal in Item #1 reveal an obliterated area on the surface. Standard restoration techniques revealed the characters "5F3C7K".
MG3FRD	The obliterated area of exhibit #1(303 stainless steel bar stock) was visually examined and chemically processed. The characters were fully restored and determined to be "5F3C7K"
MHGNW8	After preparing the surface to reveal where the identification serial number steel bar stock was engraved, we determined the following alphanumeric characteres 5F3C7C.
MKZ3Z8	The serial number 5F3C7K was recovered using the electro-magnetic method.
MLHTKD	An obliterated area was observed. Standard restoration techniques revealed the following characters: 5 F 3 C 7 K
MNMF8Q	The serial number on the piece of bar stock was determined to be 5F3C7K.
MUB6L9	Once the surface was prepared, the following alphanumeric characters were revealed 5F3C7K
MVMUVD	On examination, I found no number on the stainless steel bar stock. However, I observed the surface of the stainless steel bar was filed. After electrochemical treatment, the obliterated serial number was restored and read as "5F3C7K".
N6R7V2	Mechanical and Chemical processing of the submitted stainless steel bar stock revealed that the original serial number is 5F3C7K.
N8ZHD3	Mechanical and Chemical processing of the submitted bar stock revealed that the original serial number is 5F3C7K.
NAQJJQ	Following a chemical restoration process, I restored the serial number on the Stainless Steel Bar Stock to be "5F3C7K".
PA734N	Serial Number Restoration Analysis: Methodology: Physical (Visual Examination), Microscopy (Comparison Microscope), Chemical (Reagent Etching). Serial number restoration procedures revealed the serial number on Item 1, the metal bar stock, to be: 5 F 3 C 7 K.
PDYADJ	Visual examination and magnetic particle inspection restored the obliterated serial number on Item 1 to read "5F3C7K."
PFQ9RH	As result of an attempted obliterated number restoration the following characters were observed: 5F3C7K
PHZ9WP	The area judged to have contained obliterated markings was subjected to recovery methods such as MagnaFlux and electo-etching techniques. These techniques uncovered one line containing six alpha-numeric characters. The characters was interpreted as "5 F 3 C 7 K". No observations indicating the presence of further charaters were made. The recovered number is considered to be a serial number, however the possibility that the examined area only contains a part of the full serial number can not be excluded.
PU3UNT	Examination and restoration of the obliterated area on Item 1 (a piece of stainless steel bar stock) revealed the following characters interpreted as "5F3C7K".
Q4MNFF	Examination and restoration of the obliterated area on the steel bar stock of Item 1 revealed the following characters: "5F3C7K"
QCGT9G	The probable serial number is 5F3C7K.
QDZG2W	Standard restoration techniques revealed the following characters: 5 F 3 C 7 K.
QK8CMP	I strongly support the assumption that the serial number is 5F3C7K
QRT8QE	Number before examination was invisible. Number after examination 5F3C7K. Number was found to be grinded. Number of the above said piece of 303 stainless steel bar stock was found to be tampered

TABLE 2

WebCode	Conclusions
QWHRM3	The serial number restored by a electromagnetic method on the obliterated portion of metal bar stock (item 1) is 5F3C7K
QWNUN9	The item is a piece of stainless steel bar stock with a suspected obliterated serial number. Laboratory chemical restoration procedures revealed the follow serial number: 5F3C7K. The item will be transferred to the laboratory's "Proficiency Test Long term Storage".
R2VPYW	The stainless steel bar stock (item 1) was marked Q1, DCL, [Participant Code] on the back of the bar stock. The area with the suspected obliterated serial number was polished with a Dremel tool and then chemical etching solutions were applied. The obliterated serial number was restored to read as follows: 5F3C7K.
RAPURX	The obliterated serial number on the stainless steel bar stock in Item #1 was completely restored and found to be 5 F 3 C 7 K.
RHNJKM	A serial number restoration was carried out on a piece of bar stock (Item 1904197/001) with an obliterated number. After the application of a chemical reagent, the following characters were developed - 5F3C7K. The characters were confirmed using a known reference sample of alphanumeric numbers used in the manufacturing process. The developed characters had similar font and size to the reference sample provided.
RMC848	In preparation for the application of acid, the area/location of the serial number was sanded and polished. Upon applying Davis Reagent, the serial number was observed to be 5F3C7K.
RMU9VF	Serial number "5F3C7K" recovered using the magnetic particle inspection process.
RN7UHW	Results of Examinations: Examination and processing of the obliterated serial number on the submitted plate restored the serial number to read "5F3C7K". Methods: Serial Number: Magnetic, thermal, and chemical methods may be used for the restoration of serial numbers. Conclusions regarding restored characters are made by visual examination of the restored surface under a variety of lighting conditions. Information regarding the alpha-numeric structure or the general location of serial numbers is obtained when necessary from reference sources or from firearms in the Laboratory's Reference Firearms Collection. Limitations: Serial Number: With the exception of the magnetic method, serial number restoration is a destructive examination and it is possible that the obtained results may not be reproduced in any subsequent examinations. Restored serial numbers are sometimes only visible during a portion of the reconstruction process, and are not necessarily visible at the conclusion of the process.
RTKMDV	RECEIVED WAS ONE PIECE OF ALUMINUM BARSTOCK, WITH AN APPARENT OBLITERATED SERIAL NUMBER. THE AREA OF OBLITERATION WAS POLISHED SMOOTH WITH A DREMEL HAND TOOL, AND THEN THE CHEMICAL ETCHING RESTORATION METHOD WAS EMPLOYED VIA THE APPLICATION OF ACIDS. THE NUMBER WAS RESTORED TO "5F3C7K". THIS TOOK APPROXIMATELY 30 MINUTES TO COMPLETE.
RUCLUE	The examination and chemical processing of the above item, revealed a full serial number, with sufficient characteristics to allow the Examiner to make a positive identification. The numbers recovered are as follows, 5F3C7K.
RUR3MM	The serial number on the bar stock, Exhibit 1, was determined to be 5F3C7K.
T4HRCN	The following findings reflect the professional opinion of the examiner authoring this report. Examination of Item 1 revealed one (1) metal bar stock with suspected serial number obliterated. Using chemical and physical restoration techniques, an attempt was made to restore the serial number with the following results: Serial Number: 5 F 3 C 7 K was restored on Item 1
TB7AWQ	The serial number was restored to read 5F3C7K.
TBEHQJ	Through a combination of magnetic particle inspection, mechanical polishing, and chemical etching, the serial number for item 1 was restored to read 5F3C7K.

TABLE 2

WebCode	Conclusions
TBYGP3	Examination of Item #1 revealed an obliterated area. Standard serial number restoration techniques recovered the characters "5F3C7K".
TW2EDN	Examination of the submitted metal bar stock found the manufacturer's serial number to have been obliterated. Physical and chemical processing of the submitted metal bar stock restored the obliterated, original serial number to read "5F3C7K".
TYRDRM	Forensic Restoration Methods applied to the milled area of the steel bar stock restored a series of characters with similar font and style to the "Aluminium standard" bar stock supplied that read: 5F3C7K
U2NLWV	I restored the serial number on Item 1 to read 5F3C7K.
U4C48E	Using physical and chemical restoration techniques, the obliterated serial number on Item 1 was restored to read the following: 5F3C7K.
ULDV24	The serial number was determined to be "5F3C7K."
UPEPA7	Examination of Item #1 revealed an obliterated area. Standard restoration techniques revealed the following characters "5F3C7K".
UUTLWV	The serial number was restored to read - 5F3C7K.
UWVKV3	The metal block (item number 1) was visually and microscopically inspected for any observed digits, letters or characters. None were observed. The aluminum standard block was visually inspected to note the overall appearance of the known characters. The suspect serial number area on the metal block was sanded and polished and then chemically treated to restore its serial number. The following characteristics were noted during the restoration examination: 5 F 3 C 7 K
V4AKVC	Nothing appeared initially when I observed the metallic block. Once I buffed and used the etching chemicals Davis, Turner's and Fry's...the alpha-numeric showed up at " 5F 3C 7K ".
VA3NWF	Serial Number Restoration Analysis: Methodology: Physical (Visual Examination), Microscopy (Comparison Microscope), Chemical (Reagent Etching). Serial number restoration procedures revealed the serial number on Item 1, the bar stock, to be: 5 F 3 C 7 K
VKC8DX	We conclude that the serial number was 3E42B8. Alternate guesses for the first three numbers are 2, 5, and 6 respectively.
VPDER9	Examination and restoration of the obliterated area on Item 1 (a piece of steel bar stock) revealed the following characters: "5F3C7K".
VUKTP7	Examination of the steel bar in Item #1 revealed an obliterated area. Standard restoration techniques revealed the following characters: "5F3C7K".
VXJBKD	[No Conclusions Reported.]
W3DMZA	The Item 1 plate was physically and chemically processed in an attempt to restore the obliterated serial number with the following result: The serial number was restored to read "5 F 3 C 7 K" The restored partial serial number was not searched in any database as part of this analysis.
W48BEY	Attempts to restore the obliterated serial number on the piece of stainless steel bar stock, Item 1, were successful. The restored serial number is 5F3C7K.
W7UUFW	Lab Item(s)#: 1. Restoration Results: 5F3C7K
W8CMRR	1. The obliterated area on the Exhibit 1 metal block was visually examined and processed using magnetic particle reagent. The characters were restored to read: 5 F 3 C 7 K.
W9ZE6H	The piece of metal which had sent has analysed and we have applied the chemicals on the scratched surface. After the examination, the following serial number has obtained. (5F3C7K)
WB2F8Z	The serial number was determined to be "5F3C7K"

## TABLE 2

WebCode	Conclusions
WB8RTB	The defaced serial number of the bar stock, item 1, was magnetically and chemically processed to read: "5F3C7K".
WFGV8U	Restoration Results: 5F3C7K
WHMFLR	Chemical restoration of number on stainless steel sample. Star Time : 15:30:00. Finish Time : 15:45:00. Characters stamped : 5F3C7K
WKDE2B	Based on my findings, I am of the opinion that the steel bar number was tampered and can be restored. The original steel bar number was restored and read as 5F3C7K.
WU2DQV	The characters restored are "5F3C7K"
WVGHEL	Using standard laboratory techniques, the obliterated serial number on the Item 1-1 bar stock was restored to read "5F3C7K."
XMFVUY	As received, there was an obliterated area on the stainless steel bar stock in Item #1. Standard serial number restoration techniques were used and the characters "5F3C7K" were recovered.
XTH4Y7	ONE (1) PIECE OF STEEL BAR STOCK (1" X 2 1/2") SUBMITTED WITH SUSPECTED OBLITERATED SERIAL NUMBERS. APPROXIMATELY 1" X 1" AREA OS SURFACE DEFACED THROUGH ABRASIONS/ GRINDING. SERIAL# 5F3C7K RESTORED USING MAGNETIC PARTICLE INSPECTION PROCESS. EVIDENCE SCRIBED "CTS 19-5251" BY EXAMINER FOR IDENTIFICATION PURPOSES. NOTE: ABOVE EVIDENCE WAS SUBMITTED IN A TAN ENVELOPE LABELLED "2019 CTS FORENSIC TESTING PROGRAM, TEST NO. 19-5251: SERIAL# RESTORATION SAMPLE PACK: SNR2".
Y4ECD3	The test/item 1 has mechanical removal effects on the position of the stamped alphanumeric characters. By performing the magnetic method in restoring the obliterated serial number, the following alphanumeric characters could be seen (513C7K).
YFTAFL	The serial number on Item 1 was restored and determined to be the following: 5F3C7K
YLX2R4	An obliterated area was noted on Item 1. Standard serial number restoration techniques revealed the following characters: 5F3C7K.
YV6VUA	Using magnetic and chemical restoration techniques, the obliterated serial number was restored to read 5F3C7K.
YYNYCE	By processing with Magnaflux the number "5F3C7K" developed clearly. (vid framkallning med Magnaflux framträdde nummerbeteckningen "5F3C7K" tydligt)
Z27JWA	The serial number was restored to read "5F3C7K".
Z4WQ8X	Examination of Item #1 revealed an obliterated area. Restoration of the obliterated area on Item #1 revealed the characters "5F3C7K."
ZM46HX	The obliterated serial number on Item 1 was restored to read 5F3C7K.
ZQ8QLX	The bar stock (Item #1) was physically/chemically/magnetically processed. Its serial number was restored to read:5F3C7K.

# Sample Preparation

(listed in order of use)

TABLE 3

Sample Preparation			
WebCode	Method	Tool Used	Grit Size
23V8UV	Sanding	Sand paper	course, medium and fine
27YX3V	Polishing	Dremel	
2AZWKF	Grinding	Grinding wheel	
	Polishing	Polishing wheel	
2EPLR7	Sanding	Sand paper	Sand paper #60 and #120
32737H	Sanding	Sand paper	220
	Polishing	Dremel	Cratex rubberized polishing point
32XAYU	Polishing	Sand paper	120 and 600
3C3AKE	Polishing	Dremel	
3CYLBM	Polishing	Dremel	
3N9EJT	Visual	Microscope	
3PBXTB	None		
3QKXYH	Visual	Stereoscope	
	Polishing	Dremel	
3UKD3Z	Sanding	sandpaper	220
4A9VL3	Polishing	Dremel	
4AQQ6P	Visual	Stereoscope	
4CM9HC	Sanding	Sand paper	fine
	Polishing	Rotary Tool	
	Visual	Stereoscope	
4CTUQK	Polishing	Dremel	
4CY6MG	Polishing	Dremel	
4CYWQQ	Polishing	Dremel	
4RLJQM	Visual		
	Polishing	Dremel	
4T3QXQ	Polishing	Dremel	

TABLE 3

Sample Preparation			
WebCode	Method	Tool Used	Grit Size
62TP9W	Polishing	Dremel	
64HUUN	Visual		
	Polishing	Dremel	Dremel 4000 Cratex wheel
69PFMR	Sanding	Dremel	60 grit
	Sanding	Sand paper	1200 grit
	Polishing	Emery paper	
6AJ42G	Visual	Stereoscope	
	Sanding	Sand paper	400
	Polishing	Dremel	
	Cleaning	Acetone	
6MWA93	Polishing	Steel wool	
	Polishing	Dremel	
6VPHTT	Visual	Stereoscope	
	Polishing	Rotary Tool	#425
6WD2NY	Polishing	Flitz Polishing cream	
72Q7VT	Visual	Stereoscope	
	Polishing	Dremel	
76EN8C	None		
796Y7P	Polishing	Dremel	
7AF2TM	Polishing	Dremel	
7DL9M2	Grinding	Dremel	
7HCXCJ	Visual	Microscope	
	Cleaning	Ethanol	
	Sanding	Dremel	
7MB76U	Polishing	Dremel	
82JHRK	Polishing	Rotary Tool	
89JZ7W	Sanding	Sand paper	600
8ETYZB	Sanding	Sand paper	360, 400, 1500
8HXTTD	Polishing	Rotary Tool	
8MM4TC	Polishing	Dremel	

TABLE 3

Sample Preparation			
<u>WebCode</u>	<u>Method</u>	<u>Tool Used</u>	<u>Grit Size</u>
8PFYR7	None		
92XC3E	Visual	Stereoscope	
97B3GL	Polishing	Dremel	Unknown
9FLDYD	Polishing	Steel wool	
	Polishing	Dremel	
9GV669	Polishing	Dremel	
9HNCXJ	Polishing	Dremel	
9Q6WAW	Sanding	Sand paper	220
A62B96	Visual	Microscope	
	Polishing	Dremel	
	Visual	Microscope	
	Sanding	Sand paper	220
	Visual	Microscope	
A63YVB	Sanding	Sand paper	200
AGRZ7P	Polishing	Dremel	
AJFHZV	Polishing	Dremel	GRINDING WHEEL
ANXRG9	Cleaning	Acetone	
	Visual		
AW87E4	Visual	Stereoscope	
BB223U	Cleaning	Acetone	Not applied
	Polishing	Emery paper	Not applied
BLYX4W	Polishing	Dremel	
BRYLCN	Polishing	Dremel	
BUXFPZ	Polishing	Dremel	Abrasive pad
BW32G7	Visual	Stereoscope	
BW8FU8	Grinding	Dremel	
	Polishing	Rotary Tool	
BWYMMH	Polishing	Dremel	
CCRM9Q	None		

TABLE 3

Sample Preparation			
<u>WebCode</u>	<u>Method</u>	<u>Tool Used</u>	<u>Grit Size</u>
CWTKMC	Polishing	Dremel	
D8P67G	Polishing	Dremel	
D8XXD6	Grinding	grinding wheel	
DA3GKD	Polishing	Dremel	
DDXD2R	Polishing	Dremel	
DEQKU3	Sanding	Sand paper	80 & 150
DGXNWR	Cleaning	Kimwipe	
	Visual	Stereoscope	
	Polishing	Dremel	
	Visual	Stereoscope	
DM62UP	Visual		
DNX2L9	Visual	Stereoscope	
	Cleaning	Ethanol	
	Sanding	Sand paper	600
	Polishing	Dremel	
DPAUKH	Sanding	Sand paper	400
DR2UVZ	Sanding	Sand paper	240
	Sanding	Sand paper	600
	Polishing	Sand paper	1200
	Cleaning	Acetone	
DWRA4E	Sanding	Sand paper	Worn 320 grit
E2Y7CL	None		
E79B4L	Polishing	Dremel	
ECFWVP	Polishing	Dremel	
	Sanding	Dremel	Polishing Wheel
ECZHNE	Visual	Naked Eye	
	Polishing	Dremel	
EM3QCR	Polishing	Dremel	
EP2A8Y	Visual	hand lence	
EP6PMK	Polishing	Dremel	



TABLE 3

Sample Preparation			
<u>WebCode</u>	<u>Method</u>	<u>Tool Used</u>	<u>Grit Size</u>
EQ2AAJ	Polishing	Dremel	#425 polishing wheel
EQ4TK2	None		
EWU3UZ	Visual		
	Sanding	Dremel	300
EXHVBB	Polishing	Dremel	400, 600
F2BDPE	Visual	Stereoscope	
	Grinding	Sand paper	600
	Polishing	Dremel	
F4KEUL	Sanding	Dremel	
FAD8GM	Polishing	Dremel	
FB2QCT	Visual	Stereoscope	
	Polishing	Dremel	
FCUQ4C	Polishing	Rotary Tool	
	Sanding	Sand paper	120
FVBPGM	Polishing	Rotary Tool	
	Cleaning	Acetone	
	None		
FVRREM	Visual		
GA8J8L	None		
GALN2D	None		
GB4PWT	None		
GFD76G	Polishing	Dremel	
GMX7LU	Visual	Stereoscope	
GN6GHX	Polishing	Dremel	
GNBT39	Visual		
GURCEV	Visual	Stereoscope	
	Polishing	Dremel	
GWZHZW	Polishing	Sand paper	400Cw

TABLE 3

Sample Preparation			
<u>WebCode</u>	<u>Method</u>	<u>Tool Used</u>	<u>Grit Size</u>
HAFX6F	Grinding	Dremel	
	Polishing	Dremel	
HAHLTK	Visual	Stereoscope	
HDM6ZT	None		
HLB3HL	Polishing	Dremel	
HWUME4	Visual	Stereoscope	
	Sanding	Sand paper	1200
	Polishing	Dremel	
JHELX6	None		
JJM3NN	None		
JLBB27	Visual	Stereoscope	
K2Y9F7	Sanding	Dremel	P 220
K2ZW4B	Polishing	Dremel	
K46QE2	Polishing	Dremel	
K7DW3N	None		
K94X8C	Polishing	Rotary Tool	
KHLJBK	Cleaning	Ethanol	
KHQWYG	Polishing	Dremel	
KLNDBB	Polishing	Rotary Tool	
KVFPJ	Sanding	Dremel	
KVWUZW	Polishing	Emery paper	
KW8WMV	Polishing	Dremel	
KWAPE2	Visual	Stereoscope	
L47HMV	Polishing	Sand paper	600
LB69TD	Visual	Stereoscope	
	Polishing	Dremel	
	Cleaning	Acetone	
LGTWHH	Polishing	Dremel	

TABLE 3

Sample Preparation			
WebCode	Method	Tool Used	Grit Size
LJKVWF	Polishing	Dremel	800
LMCBU2	Polishing	Dremel	
LUZZPX	Polishing	Dremel	
M379NA	Polishing	Rotary Tool	
M3NX8Q	Polishing	Rotary Tool	
M9BYY3	Polishing	Dremel	
MG3FRD	Sanding	Sand paper	220
	Polishing	Steel wool	
MHGWN8	Sanding	Sand paper	400
	Polishing	Dremel	
MKZ3Z8	Visual	Stereoscope	
	Cleaning	Acetone	
	Sanding	Sand paper	400-600
	Polishing	Dremel	
MLHTKD	Polishing	Rotary Tool	
MNMF8Q	Polishing	Dremel	
MUB6L9	Cleaning	Acetone	
	Sanding	Sand paper	400
	Polishing	Dremel	
MVMUVD	Cleaning	Acetone	
N6R7V2	Polishing	Sand paper	Fine
N8ZHD3	Polishing	Sand paper	400
NAQJJQ	Visual	Stereoscope	
	Cleaning	Acetone	
	Sanding	Sand paper	600
	Polishing	Emery paper	1200
	Polishing	Rotary Tool	Green Chromium Oxide Buffing wax
	Cleaning	Acetone	
PA734N	None		

TABLE 3

Sample Preparation			
<u>WebCode</u>	<u>Method</u>	<u>Tool Used</u>	<u>Grit Size</u>
PDYADJ	None		
PFQ9RH	Polishing	Steel wool	
PHZ9WP	Visual	Stereoscope	
	Cleaning	Acetone	
	Polishing	Dremel	Exact grit size is unknown but very fine
PU3UNT	Visual	Stereoscope	
	Cleaning	Acetone	
	Polishing	Dremel	#240 metal polish wheel
	Cleaning	Acetone	
	Visual	Stereoscope	
Q4MNFF	Visual	Stereoscope	
	Polishing	Dremel	Extra Fine
QCGT9G	None	Dremel	Disc no 412
QDZG2W	Polishing	Rotary Tool	
QK8CMP	None		
QRT8QE	Sanding	Sand paper	80-120
QWHRM3	Visual	Stereoscope	
	Sanding	Sand paper	600
	Polishing	Dremel	
	Cleaning	Acetone	
QWNUN9	Polishing	Dremel	
R2VPYW	Polishing	Dremel	
RAPURX	None		
RHNJKM	Sanding	Sand paper	240
	Sanding	Sand paper	400
	Sanding	Sand paper	800
	Sanding	Sand paper	1200
	Polishing	Cut and Polish	
	Cleaning	Acetone	

TABLE 3

Sample Preparation			
<u>WebCode</u>	<u>Method</u>	<u>Tool Used</u>	<u>Grit Size</u>
RMC848	Sanding	Dremel	60
	Sanding	Sand paper	1200
	Polishing	Emery paper	
RMU9VF	Polishing	Rotary Tool	
RN7UHW	Visual	Microscope	
RTKMDV	Polishing	Dremel	
RUCLUE	Polishing	Dremel	
RUR3MM	Polishing	Sand paper	180
T4HRCN	None	Stereoscope	
TB7AWQ	Visual		
	Polishing	Dremel	
TBEHQJ	Visual	Stereoscope	
	Polishing	Dremel	
	Sanding	Sand paper	400
TBYGP3	Polishing	Dremel	
TW2EDN	Polishing	Dremel	
	Sanding	Sand paper	600
TYRDRM	None	Positest Metal and paint thickness tester	Non Ferrous/ however magnetic
	Polishing	Sand paper	1200 grit wet n dry
U2NLVW	None	MagnaFlux without surface prep	
	Sanding	Sand paper	150, 220, 400, and 800
U4C48E	None		
ULDV24	None		
UPEPA7	Polishing	Dremel	
UUTLWV	Sanding	Sand paper	600
UWVKV3	Sanding	Sand paper	400, 1500, 2000
	Visual	Stereoscope	
V4AKVC	Polishing	Dremel	

TABLE 3

Sample Preparation			
<u>WebCode</u>	<u>Method</u>	<u>Tool Used</u>	<u>Grit Size</u>
VA3NWF	Visual	Microscope	
VKC8DX	Polishing	Sand paper	1200
	Sanding	Ethanol	
VPDER9	Visual	Stereoscope	
	Polishing	Dremel	Cratex fine abrasive finishing accessory
VUKTP7	None		
VXJBKD	Visual		
	Cleaning	Acetone	
W3DMZA	Polishing	Dremel	
W48BEY	Polishing	Dremel	Super Fine P400
W7UUFW	Visual		
	Polishing	Dremel	
W8CMRR	None		
W9ZE6H	Visual	Microscope	
	Grinding	Dremel	
	Cleaning	Acetone	
WB2F8Z	Polishing	Dremel	
WB8RTB	None		
WFG8U	Polishing	Dremel	
WHMFLR	Cleaning	Sand paper	
WKDE2B	Cleaning	Acetone	
WU2DQV	Polishing	Dremel	unknown
	None		
WGHEL	Grinding	Grinding/Polishing Wheel	
XMFVUY	Polishing	Dremel	
XTH4Y7	Polishing	Dremel	
Y4ECD3	Visual		
YFTAFL	None		

TABLE 3

<b>Sample Preparation</b>			
<b>WebCode</b>	<b>Method</b>	<b>Tool Used</b>	<b>Grit Size</b>
YLX2R4	Visual	Stereoscope	
YV6VUA	None		
YYNYCE	Grinding	Dremel	
	Polishing	Dremel	
Z27JWA	Polishing, Sanding	Dremel	300 grit
Z4WQ8X	Polishing	Dremel	
ZM46HX	Polishing	Emery stones	240 and 600
ZQ8QLX	Sanding	Sand paper	medium

<b>Response Summary</b>		Participants: 200
<b>Sample Preparation</b>		
Visual Method:	49	
Sanding Method:	42	
Polishing Method:	127	
None:	30	
<p>Note: The total number of preparation methods used is not equivalent to the total number of participants because some participants used more than one sample preparation method.</p>		

# Recovery Methods

(listed in order of use)

TABLE 4

Recovery Methods		
WebCode	Method	Time
23V8UV	Fry's Reagent	20mins
27YX3V	Fry's Reagent	5 to 10 seconds each application
	Acid Etch Method	5 to 10 seconds each application
	acetone	wiped with a kim wipe during restoration
	remington oil	after restoration applied and wiped off
2AZWKF	Fry's Reagent	Approx 3 minutes
	Acid Etch Method	Approx 1 minute
2EPLR7	Fry's Reagent	Nitric acid 3 minutes, Fry 5 minutes
32737H	MagnaFlux	
	Davis Reagent	10 minutes
32XAYU	Fry's Reagent	5 minutes
3C3AKE	Fry's Reagent	40 minutes
3CYLBM	Acid Etch Method	10 Minutes Total
	25% Aluminum Solution	4 Minutes
	Ferric Chloride Solution	4 Minutes
	Fort's Solution	1 Minute
	Turner's Reagent	1 Minute
3N9EJT	MagnaFlux	
3PBXTB	MagnaFlux	
3QKXYH	Ferric Chloride	10 Seconds at a time
	Phosphoric Acid / Nitric Acid	10 Seconds at a time
3UKD3Z	Fry's	45 mins
4A9VL3	Turner's Reagent	5 MINUTES
4AQQ6P	MagnaFlux	
4CM9HC	Fry's Reagent	45 min
4CTUQK	Fry's Reagent	3-5 minutes x 4 times
	Turner's Reagent	3-5 minutes x 4 times
4CY6MG	Fry's Reagent	
4CYWQQ	Acidic Ferric Chloride	5 minutes



TABLE 4

## Recovery Methods

WebCode	Method	Time
4RLJQM	Fry's Reagent	a few seconds then wiped off with a Q-tip
	20% Nitric Acid	a few seconds then wiped off with a Q-tip
4T3QXQ	Fry's Reagent	couple of minutes
	25% Nitric Acid	about 1 minute
62TP9W	25% Nitric Acid	
	Modified Fry's Reagent	
64HUUN	MagnaFlux	
	Davis Reagent	5 minutes
	Turner's Reagent	3 minutes
	MagnaFlux	
69PFMR	Acid Etch Method	Thirty minutes
6AJ42G	MagnaFlux	5 minutes
	Fry's Reagent	3
6MWA93	Turner's Reagent	<1 minute
	Fry's Reagent	~3 minutes
6VPHTT	MagnaFlux	
	Fry's Reagent	Wiped with swab
6WD2NY	Acid Etch Method	10 seconds
	MagnaFlux	
72Q7VT	Fry's Reagent	four (4) applications of ~four (4) minutes each
76EN8C	MagnaFlux	
796Y7P	Fry's Reagent	1 minute
7AF2TM	Fry's Reagent	5 minutes
7DL9M2	Fry's Reagent	5 minutes
	Turner's Reagent	5 minutes
	Davis' Reagent	5 minutes
7HCXCJ	Acidic Ferric Chloride	1 MINUTE
	Fry's Reagent	30 SECOND
	ETHYL ALCOHOL	30 SECOND
	MAGNETIC METHOD	
	PHYSICAL METHOD	
	CHEMICAL METHOD	
	NITRIC ACID	30 SECOND

TABLE 4

Recovery Methods		
WebCode	Method	Time
7MB76U	Acidic Ferric Chloride	It was brushed across the area in question as often as needed
	25% Nitric Acid	It was brushed across the area in questions as often as needed
82JHRK	MagnaFlux	
	Fry's Reagent	3-5 minutes
89JZ7W	MagnaFlux	
8ETYZB	Fry's Reagent	5 seconds x 2 times
8HXTTD	Davis' reagent	<1 minute
	Fry's Reagent	<1 minute
	Griffin Reagent	<1 minute
	Fry's Reagent	~30 minutes
8MM4TC	Turner's Reagent	5 minutes
	Davis	5 minutes
	Fry's Reagent	15 minutes
8PFYR7	MagnaFlux	
92XC3E	Davis Reagent	2mins
	Fry's Reagent	2mins
97B3GL	Acidic Ferric Chloride	Didn't time
	Fry's Reagent	Didn't time
9FLDYD	Fry's Reagent	~2 minutes
9GV669	Fry's Reagent	7-8 minutes
9HNCXJ	Fry's Reagent	two minutes
	Acidic Ferric Chloride	
	Acidic Acid	
	MagnaFlux	
9Q6WAW	Ferric Chloride	~10 seconds with each use
	Acidic Ferric Chloride	~10 seconds with each use
	25% Nitric Acid	~10 seconds with each use
	10% Sodium Hydroxide	~10 seconds with each use
A62B96	Fry's Reagent	1-2 minutes
A63YVB	Magnetic Particle Inspection (MPI)	
AGRZ7P	Acid Etch Method	
	Acidic Ferric Chloride	
	25% Nitric Acid	

TABLE 4

Recovery Methods		
WebCode	Method	Time
AJFHZV	Magnetic Particle Inspection (MPI)	
	Acid Etch Method	45 MIN TOTAL
ANXRG9	MagnaFlux	
AW87E4	Fry's Reagent	10
BB223U	Magnetic Particle Inspection (MPI)	Not applied
	Fry's Reagent	130 Seconds
BLYX4W	Fry's Reagent	Swabs applied for 3 minutes
BRYLCN	Fry's Reagent	5 - 10 seconds per swab
	20% Nitric Acid	5 - 10 seconds per swab
BUXFPZ	Fry's Reagent	1 minute
	Fry's Reagent	2 minutes
	25% Nitric Acid	30 seconds
BW32G7	Fry's Reagent	Approximately 20 minutes
BW8FU8	MagnaFlux	
BWYMMH	Fry's Reagent	30 seconds
	25% Nitric Acid	30 seconds
	Fry's Reagent	30 seconds
	25% Nitric Acid	30 seconds
CCRM9Q	MagnaFlux	
CWTKMC	Acid Etch Method	Davis Reagent
D8P67G	MagnaFlux	
	Fry's Reagent	4 swabs of 30 - 45 seconds each
	Acetone and Remoil after restoration	
D8XD6	Fry's Reagent	5 minutes
	10% Nitric	
DA3GKD	MagnaFlux	
	Fry's Reagent	5 minutes
DDXD2R	Magnetic Particle Inspection (MPI)	
DEQKU3	Fry's Reagent	3 minutes
DGXNWR	Magnetic Particle Inspection (MPI)	
DM62UP	Fry's Reagent	10 minutes
	Acidic Ferric Chloride	8 minutes
DNX2L9	Electro-magnetic	

TABLE 4

Recovery Methods		
WebCode	Method	Time
DPAUKH	Fry's Reagent	30 Seconds
	25 % Nitric Acid	30 Seconds
	Baking Soda	
	Fry's Reagent	30 Seconds
	25% Nitric Acid	30 Seconds
	Baking Soda	
DR2UVZ	Fry's Reagent	1 to 2 minutes
DWRA4E	MagnaFlux	
E2Y7CL	Fry's Reagent	5 minutes
	25% Nitric Acid	2 minutes
E79B4L	MagnaFlux	
	Acidic Ferric Chloride	minutes
	Acid Etch Method	20% Nitric - minutes
	Fry's Reagent	minutes
	oil for stabilizing after chemical etching	oil not removed
ECFWVP	Acid Etch Method	Total four minutes
ECZHNE	MagnaFlux	N/A
	Fry's Reagent	approximately 3 minutes total
	20% Nitric Acid	approximately 1 minute total
EM3QCR	Fry's Reagent	APPROXIMATELY 2 MINUTES
	Turner's Reagent	APPROXIMATELY 2 MINUTES
EP2A8Y	Turner's Reagent	10 seconds
	Fry's Reagent	10 seconds
EP6PMK	Fry's Reagent	5 min
EQ2AAJ	Fry's Reagent	2 applications: ~5 minutes
EQ4TK2	MagnaFlux	
EWU3UZ	MagnaFlux	
EXHVBB	Fry's Reagent	about 1 minute
F2BDPE	Fry's Reagent	5 MINUTES
F4KEUL	MagnaFlux	
FAD8GM	Fry's Reagent	
	25 % Nitric Acid	

TABLE 4

## Recovery Methods

<b>WebCode</b>	<b>Method</b>	<b>Time</b>
FB2QCT	MagnaFlux Fry's Reagent	~ 30 seconds
FCUQ4C	Acidic Cupric Sulfate	1-2 minute
FVBPGM	Fry's Reagent	2 minutes
FVRREM	MagnaFlux	
GA8J8L	Fry's Reagent 25% Nitric Acid	30 seconds 30 seconds
GALN2D	Fry's Reagent	Twenty (20) minutes
GB4PWT	MagnaFlux 400 Grit Sand Paper MagnaFlux	
GFD76G	Fry's Reagent	
GMX7LU	MagnaFlux	
GN6GHX	Fry's Reagent	2-3 Minutes
GNBT39	MagnaFlux	
GURCEV	Magnetic Particle Inspection (MPI) Acid Etch Method Turner's Reagent Fry's Reagent	(Davis) left on for less than 1 minute. Left on for less than 1 minute. Approximately 1 minute
GWZHZW	Fry's Reagent	2 minutes
HAFX6F	magnetic field method (fluid pad) magneto-optical method chemical etching	FRY and ADLER, 10-15 sec several times
HAHLTK	Fry's Reagent 25% Nitric Acid	1 - 2 minutes 1 - 2 minutes
HDM6ZT	MagnaFlux	
HLB3HL	Fry's Reagent	Five minutes
HWUME4	MagnaFlux	
JHELX6	MagnaFlux	
JJM3NN	MagnaFlux Fry's Reagent Turner's Reagent	 5 minutes 5 minutes

TABLE 4

## Recovery Methods

<b>WebCode</b>	<b>Method</b>	<b>Time</b>
JLBB27	Acid Etch Method	Davis Reagent
K2Y9F7	Electro-magnetic Fry's Reagent	5 second
K2ZW4B	MagnaFlux	
K46QE2	Fry's Reagent Davis Reagent	15 minutes 30 minutes
K7DW3N	Acid Etch Method	3 min.
K94X8C	Acid Etch Method	5 minutes
KHLJBK	Acid Etch Method	7 min
KHQWYG	Fry's Reagent Nitric Acid 25 %	1 minute 1 minute
KLNDDB	Acidic Ferric Chloride	
KVFPUJ	Fry's	1 hr
KVWUZW	Davis's Reagent Turner's Reagent 25% Nitric Acid Turner's Reagent	1 minute 30 minutes 10 seconds 20 seconds
KW8WMV	Acidic Ferric Chloride	5 minutes
KWAPE2	MagnaFlux Fry's Reagent	 2 minutes
L47HMV	Acid Etch Method Fry's Reagent	10 mins (no reaction) 20 mins (with current applied)
LB69TD	MagnaFlux Fry's Reagent 20% Nitric Acid	 applied and swabbed over a period of 10 minutes 10-20 seconds
LGTWHH	Fry's Reagent	4 minutes
LJKVWF	MagnaFlux Fry's Reagent	 30 SEC
LMCBU2	MagnaFlux Fry's Reagent	 10 minutes
LUZZPX	Acidic Ferric Chloride	Swabbed on an off for approximately 15 min.
M379NA	Fry's Reagent	1-2 minutes

TABLE 4

## Recovery Methods

<b>WebCode</b>	<b>Method</b>	<b>Time</b>
M3NX8Q	MagnaFlux	
M9BYY3	Acid Etch Method	20% Nitric Acid; less than one minute at a time
	Fry's Reagent	less than one minute at a time
MG3FRD	Davis	8 minutes
	Turner's Reagent	8 minutes
	Fry's Reagent	10 minutes
	Turner's Reagent	2 minutes
MHG8W8	MagnaFlux	
	Fry's Reagent	
MKZ3Z8	Electro-magnetic	10 minutes
MLHTKD	Fry's Reagent distilled water	2 minutes
MNMF8Q	Magnetic Particle Inspection (MPI)	
	Fry's Reagent	2 minutes
MUB6L9	MagnaFlux	
MVMUVD	Acid Etch Method	5 minutes
N6R7V2	Fry's Reagent	Approximately 5 minutes
N8ZHD3	MagnaFlux	
	Fry's Reagent	3 Min
NAQJJQ	Griffin Reagent	8 minutes
PA734N	Davis Reagent	30 minutes
	25% Nitric Acid	30 seconds
PDYADJ	MagnaFlux	
PFQ9RH	Ferric Chloride Acidic Ferric Chloride 25% Nitric acid 10% NAOH	
PHZ9WP	MagnaFlux	
PU3UNT	Fry's Reagent	2 minutes - 12 minutes
Q4MNFF	Fry's Reagent	5 minutes
	Fry's Reagent	5 minutes
	Fry's Reagent	5 minutes

TABLE 4

Recovery Methods		
WebCode	Method	Time
QCGT9G	Fry's Reagent	10minutes
QDZG2W	MagnaFlux	
QRT8QE	Acid Etch (Nitric Acid Solution 25% Modified Fry's Solution)	Two minutes alternatively
QWHRM3	Electro-magnetic	
QWNUN9	Fry's Reagent	approx. 1 minute
R2VPYW	ACIDIC FERRIC CHLORIDE	3 MINUTES
	FORT'S SOLUTION	5 MINUTES
RAPURX	Fry's Reagent	~ 5 minutes
RHNJKM	Fry's Reagent	1 minute
RMC848	Acid Etch Method	approximately 5 minutes
RMU9VF	Magnetic Particle Inspection (MPI)	
RN7UHW	MagnaFlux	
RTKMDV	Acid Etch Method	APPROXIMATELY 10 MINUTES
RUCLUE	Davis	10 seconds
	Turner's Reagent	10 seconds
	Fry's Reagent	10 seconds
RUR3MM	Acid Etch Method	
T4HRCN	Sulfuric Acid Grinder	Used swab to rub acid over area
TB7AWQ	Magnetic Particle Inspection (MPI)	
TBEHQJ	MagnaFlux Magnetic Particle Inspection (MPI)	
	Turner's Reagent	~1 min per application, total ~20 min
	Fry's Reagent	~1 min per application, ~5 min total
TBYGP3	20% Nitric Acid	swiped with cotton swabs
	Acidic Ferric Chloride	swiped with cotton swabs
	Fry's Reagent	swiped with cotton swabs
TW2EDN	MagnaFlux Fry's Reagent	~30 seconds
TYRDRM	Fry's Reagent	Constantly swabbed over an hour



TABLE 4

Recovery Methods		
WebCode	Method	Time
U2NLW	MagnaFlux Additional sanding w/ 150, 220, 400, and 800 grit sand paper MagnaFlux	
U4C48E	MagnaFlux Fry's Reagent	less than 1 minute (brushed across surface)
ULDV24	Magnetic Particle Inspection (MPI) Polish Magnetic Particle Inspection (MPI) Davis Fry's Reagent Davis	~30 seconds ~30 seconds ~10 seconds
UPEPA7	Acidic Ferric Chloride Acid Etch Method	Only left on as it was swiped. 25 % Nitric Acid swiped.
UUTLWV	Ferric Chloride Acidic Ferric Chloride	5 min 10 min
UWVKV3	Davis	5 minutes
V4AKVC	Davis Turner's Reagent Fry's Reagent	less than 10 seconds less than 10 seconds less than 10 seconds
VA3NWF	Fry's Reagent	10 minutes
VKC8DX	Thermal Imaging	
VPDER9	Fry's Reagent	seven minutes
VUKTP7	Fry's Reagent	Approximately 30 seconds
VXJBKD	MagnaFlux Electro-acid	
W3DMZA	Fry's Reagent	1 minute
W48BEY	MagnaFlux	
W7UUFW	MagnaFlux Fry's Reagent 20% Nitric Acid	A few seconds A few seconds
W8CMRR	MagnaFlux	

TABLE 4

## Recovery Methods

WebCode	Method	Time
W9ZE6H	Fry's Reagent	10 seconds
	Turner's Reagent	
	Acid Etch Method	
WB2F8Z	Magnetic Particle Inspection (MPI)	
	Polished with dremel	
	Davis	~20 seconds
	Fry's Reagent	~20 seconds
	Magnetic Particle Inspection (MPI)	
	Fry's Reagent	~20 seconds
	Polished with dremel	
	Fry's Reagent	~20 seconds
	Turner's Reagent	~5 seconds
	Davis	~60 seconds
WB8RTB	Turner's Reagent	~5 seconds
	Magnetic Particle Inspection (MPI)	
	Fry's Reagent	15 minutes
WFVG8U	Fry's Reagent	5-10 seconds
	20% Nitric Acid	5-10 seconds
WHMFLR	Acidic Ferric Chloride	15
WKDE2B	Acid Etch Method	15 minutes
WU2DQV	Fry's Reagent	1 minute
WVGHEL	Fry's Reagent	5 minutes
	Nitric Acid 10%	5 minutes
XMFBVUY	Fry's Reagent	~5 minutes
XTH4Y7	MagnaFlux	
	Acid Etch Method	1 hour total
Y4ECD3	Magnetic Particle Inspection (MPI)	
YFTAFL	Fry's Reagent	For as long as it took to restore the characters
YLX2R4	Fry's Reagent	10 - 15 seconds per swab
	25% Nitric Acid	10 - 15 seconds per swab
YV6VUA	Magnetic Particle Inspection (MPI)	
	Acidic Ferric Chloride	3min
YYNYCE	MagnaFlux	

TABLE 4

<b>Recovery Methods</b>		
<b>WebCode</b>	<b>Method</b>	<b>Time</b>
Z27JWA	Chemical Etching Electrolytic MagnaFlux Fry's Reagent "CACEE"	
Z4WQ8X	Fry's Reagent	About 5 minutes
ZM46HX	Fry's Reagent	1-2 minutes
ZQ8QLX	Fry's Reagent Acidic Ferric Chloride MagnaFlux	1 minute 1 minute 1 minute

<b>Response Summary</b>		<b>Participants: 199</b>
<b>Recovery Methods</b>		
<b>Chemical Processing:</b>	<b>155</b>	
<b>Magnetic Processing:</b>	<b>77</b>	
<p>Note: The total number of recovery methods used is not equivalent to the total number of participants because some participants used more than one recovery method.</p>		

# Additional Comments

TABLE 5

WebCode	Additional Comments
3N9EJT	MAGNAFLUX UTILISED ONLY AS NUMBER RESTORATION WAS SUCCESSFUL, WITHOUT THE REQUIREMENT TO USE ANY FURTHER PREPARATION OF THE SURFACE.
4CM9HC	A visual examination clearly shows the C in the alpha numeric digits, but when photographed there appeared to be a 0. The C was chosen over what could have been the influence of a photographic enhancement.
4CYWQQ	Other = 25% nitric acid was used first, before acidic ferric chloride
6AJ42G	Document results with photography
76EN8C	The aluminum bar sample stock, intended as a "reference for size, shape, and positioning of alphanumeric characters," was not consistent with my recovered serial number. My recovered serial number displayed a round topped number 3, and alphanumeric characteristics with a "serif" styled font. (In typography, a serif is a small line or stroke regularly attached to the end of a larger stroke in a letter or symbol.) The aluminum bar stock displayed a flat topped number 3, and alphanumeric characters "sans serif." Given the purpose of the standard, this discrepancy could be troublesome.
8MM4TC	Times are approximate. Laboratory procedure does not require timing of acid application.
97B3GL	The metal block was checked with two different magnets and did not appear to be magnetic. It was checked with a magnet of a co-worker and it appeared to be magnetic. It was then checked with several other magnets and was found to either be slightly magnetic or not magnetic. Must have a very low iron percentage as it is magnetic but not very.
9Q6WAW	I used all four chemicals, in order, for 3 rounds. I then used the ferric chloride again which began to make the obliterated serial number visible. I then used acid ferric chloride, for 3 rounds, which successfully produced the obliterated serial number.
AW87E4	Did not polish.
BB223U	Magnetic Particle Inspection (MPI): The sample is cover by a bag containing magnetic particle solution(magnaflux bath)to the serial number area while applying a magnetic filed through the use the horseshoe. Magnaflux bath were prepared by using MAGNAVIS(R) 7HF, WB-27, 1ml of W-27 in 50 ml of water. Fry's Reagent: After the location of the area recommended for the typing of the characters filed on the sample, the sample was cleaned and acetone was used for this purpose, followed by polishing by emery paper to obtain smooth surface and in the last step the targeted area was immersed for a duration of 130 seconds by Fry's Reagent which is a mixture of (100 ml distilled water - 90 g copper chloride (CuCl <sub>2</sub> ) - 120 ml hydrochloric acid) which it has ultimately allows to reveal the filed characters.
DNX2L9	The firs time obtained positive result with the electro-magnetic method.
E79B4L	Polishing, Magnaflux, 20% Nitric Acid, Acidic Ferric Chloride, Fry's Reagent, Fry's Regent with 20% Nitric Acid
ECZHNE	Additional polishing with the Dremel was done throughout the restoration. Current reporting at my laboratory utilizes tables to report Findings. This cannot be accommodated on the CTS answer sheet so the Findings were written out in sentences.

TABLE 5

WebCode	Additional Comments
FCUQ4C	The serial number restoration on the steel block was fully restore from (Item 1) to read: 5F3C7k
GA8J8L	Alternated swabs of Fry's reagent and Nitric Acid
GB4PWT	Sanding removed the milling marks and allowed for clear visualization of the serial number using Magnaflux. The 'F' was difficult to capture photographically but was clearly visible.
HAHLTK	Alternating swabs of the Fry's Reagent and 25% Nitric Acid were used. The obliterated area was swabbed with acid and let sit for a minute or two before the next swab of the other acid was applied. Breaks were taken to examine the obliterated area and take some record images of the restoration process. Total time for restoration was approximately 30 minutes.
HWUME4	The results obtained was document with photography.
K94X8C	Fry's Reagent
M9BYY3	After the chemical processing was completed, the area of obliteration was covered with rem oil to prevent corrosion.
MUB6L9	Development is achieve.
PHZ9WP	In addition to the test specimens prepared by machining off the surface to a predetermined depth (and so providing a consistent test specimen/test difficulty for all parricipants, it should be considered to expand the test specimen concept. Ideally, oblitative methods more consistent with real-life situations should be added such, usually grinding by hand resulting in varying direction, width and depth of material removal.
QWHRM3	A good positive result was obtained during the first attempt and therefore only the electromagnetic process was applied.
R2VPYW	Full restoration of serial number 5F3C7K
T4HRCN	The last letter of the serial number was very close to the edge of the serial number area that was grounded down.
V4AKVC	Nothing initially appeared when I observed the metallic block. Once I buffed and used the chemical etching sequence of Davis, Turner's and Fry's...I was able to recover the alph-numeric of " 5F 4C 7K ".
VUKTP7	Applied swabs of Fry's Reagent for approximately 30 seconds at a time. Continued applying swabs of Fry's until the serial number was recovered.
W9ZE6H	The surface was clean but the scratches had the estimated depth 2 mm. The surface was recovered for analysis and all these examinations process took 10 minutes.
WKDE2B	The original number of steel bar is 5F3C7K.
YV6VUA	Before applying acid, a dremel was used to polish the surface. This was after it had been restored using magnetic particle inspection.
YYNYCE	The result was so good that further methods were considered unnecessary.

-End of Report-  
(Appendix may follow)

## Test No. 19-5251: Serial Number Restoration

DATA MUST BE SUBMITTED BY **Sept. 9, 2019, 11:59 p.m.** TO BE INCLUDED IN THE REPORT

Participant Code: U1234A

WebCode: 74GBM6

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.

*Please Note: A piece of aluminum bar stock labeled as 'Aluminum Standard' was also included in the sample set and is intended as a reference for size, shape and positioning of the stamped alphanumeric characters used in the serial number.*

**Items Submitted (Sample Pack SNR2):**

Item 1: A piece of 303 stainless steel bar stock with suspected obliterated serial number.

**1.) Please record the restored characters below.**

The serial number on this material consists of 6 characters.

Item 1:

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

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

**3.) What methods were used to prepare the sample prior to attempts at recovery?**

eg. Sanding, Polishing, Visual, etc. (Please describe in order.)

Method	Tool Used	If sanding was done what grit size was used?

**4.) What recovery methods were used during your examination?**

eg. Fry's, Acid Etch, MagnaFlux, etc. (Please list in order of use)

Method	If an acidic method was used how long was the acid left on the material?

## 5.) Additional Comments

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



## RELEASE OF DATA TO ACCREDITATION BODIES

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

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

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

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

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

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

A2LA Certificate No.

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

Authorized Contact Person and Title

Laboratory Name

Location (City/State)