

Final Report (December 2019)

Proficiencytesting@forensicfoundations

Ignitable Fluids Collaborative Study 2019-7

Authorised by Dale Parsell, Quality Manager, Forensic Foundations,
17/12/2019.

| | |
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| PO Box 2279, Ringwood North VIC 3134 | Office: 03 9018 8919 Mobile: 0429 966 012 |
| quality@forensicfoundations.com.au www.forensicfoundations.com.au | ABN 23 839 112 155 ACN 130 236 618 |

Contents

| | |
|---|----|
| Introduction | 3 |
| Design | 3 |
| IGNITABLE FLUID COLLABORATIVE STUDY 2019-7 | 4 |
| Laboratory Responses | 4 |
| CONTINUITY, RECEIPT and DESCRIPTION of ITEMS | 4 |
| EXAMINATION / ANALYSIS | 6 |
| Conclusion and Summary of the Test | 11 |
| APPENDIX A..... | 16 |
| APPENDIX B..... | 19 |
| APPENDIX C | 21 |
| APPENDIX D | 22 |
| Ignitable Fluid – Collaborative Study 2019-7 Feedback | |
| Recommendation for Proficiency Test development | |

Introduction

Design

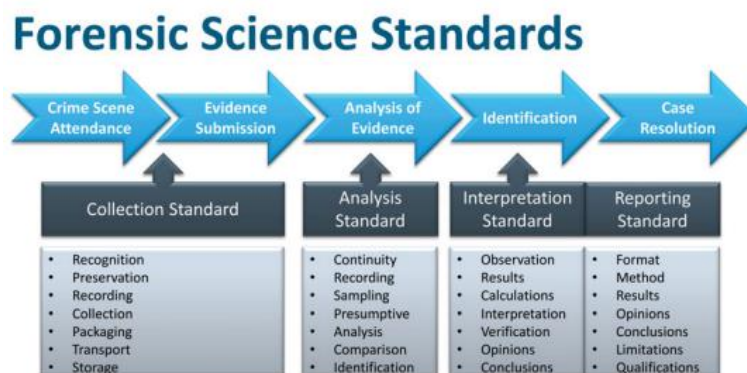
Forensic Foundations' Proficiency Tests are designed to address the following points

- Relevance to forensic science laboratories;
- Limitation of any potential context information;
- Knowledge of the 'ground truth' of samples;
- Importance of consistency between tests; and
- Cost affordability for the laboratories.

In addition to this exercise being a test of your laboratory procedures using controlled items, we also anticipated that it will enable participants to evaluate the quality of their analytical results against those from other laboratories and observe how other laboratories express their opinions or advice to clients. To enable this, we requested that participants submit the following:

- An outline of the methodology used; and
- Their opinion in the format that they would provide to court.

Forensic Foundations' Proficiency Tests are designed to test the end-to-end forensic examination process. The AS5388 and the ISO21043 series of Standards describe the forensic examination process from collection to reporting. This figure¹ illustrates the inter-relatedness of all steps in this process and was used as the basis of the Australian Standards' development. The figure is also used as the basis of the development of Forensic Foundations' Proficiency Tests.



Thus, all Forensic Foundations' Proficiency Tests commence with item collection and/or receipt and all the subsequent examination / analysis steps, culminating in the reporting, therefore reflecting actual forensic casework.

The Final Reports of this 2019 collaborative trial will be publicly available via Forensic Foundations web site. Participating laboratories may use the report as outlined in their respective laboratory policies.

¹James Robertson, Karl Kent & Linzi Wilson-Wilde (2013) The Development of a Core Forensic Standards Framework for Australia, Forensic Science Policy & Management: An International Journal, 4:3-4, 59-67

IGNITABLE FLUID COLLABORATIVE STUDY 2019-7

Three laboratories were involved in submitting results during this round of testing.

The manufacture, distribution, assessment and reporting of this proficiency test has provided, and will provide, the basis for continuous improvement for both Forensic Foundations and the participating laboratories.

In addition to interpreting the results from known samples, testing generic issues such as receipt, triage and continuity of items for examination also formed part of the overall process.

Laboratory Responses

CONTINUITY, RECEIPT and DESCRIPTION of ITEMS

Laboratory 47496 gave a full description of the packaging and item description upon initial receipt.

Item 1 received in good order. The item contains a grey piece of carpet of about 8 x 16 cm. Some burn marks are visible on the carpet. The carpet was sealed within a double Nylon bag. A carbon strip with a size of about 1 x 2 cm was present between the inner and the outer Nylon bag.

Laboratory 96150A gave a full description of the packaging and item description upon initial receipt. (NOTE Description was handwritten, re-typed by FF).

The outer packaging of the exhibit, a clear sealed plastic bag was labelled.

Case No 004980/190 14/08/2019

Item 1 14:41

Forensic Foundations

2019 Interlab Collaborative Trial

Ignitable Fluid Residue Test

Due 14/10/2019

Name (removed by FF)

(barcode)

20198-F-0326-0001

V301024 (signature)

Inside the bag was a sealed yellow envelope labelled "Ignitable Fluid Residue Interlaboratory Collaborative Trial 2019-7"

Inside the envelope was a sealed tamper evident bag (TEB) (AUS0015618) labelled

*"carpet between lounge and hallway
23 Avis Ave"*

The TEB contained an unlabelled clear sealed plastic bag. This bag contained a carbon strip (for testing) and another clear sealed plastic bag.

The innermost plastic bag was labelled:

“23 Avis Ave, Smithville

Burnt trail – doorway between lounge and hallway (signature) 23/7/19, and contained a section of partly burnt carpet.

The section of light grey carpet was approx. 17 x 8 Cm with a lightly burnt/ melted strip down the middle, the outer edges and the underside were unburnt.

Laboratory 96150T gave a full description of the packaging and item description upon initial receipt.

Laboratory records show that an item said to relate to this matter was received on the 7 August 2019.

Receipt 23/08/2019 @0900hrs

- *One gold envelope was received (“...Trial 2019-7” “96150T”)*
 - *Within this outer gold envelope was a TEAB (“carpet between lounge and hallway 23 Avis Ave.”)*
 - *The TEAB contained an unlabelled plastic bag, which contained*
 - *a carbon strip (1.02) The carbon strip was placed into a sealed gc vial and labelled 1.02.*

No further examination was conducted on the carbon strip at this time, due to being outside our standard test procedure.

- *A plastic bag (“23 Avis Ave, Smithville. Burn trail – doorway between lounge and hallway”), which contained*
 - *a piece of carpet (1.01)*

Grey carpet piece, approximately 9cm x 14cm in size. The pile was approximate 1.5cm thick. There was a discoloured strip running the full length of the carpet. Labelled 1.01.

Upon completion of the examination, the items were returned to secure storage.

EXAMINATION / ANALYSIS

Laboratory 47496

The sample was heated for 4 hours at 70°C. The headspace in the Nylon bag was analysed with GC-FID and another part of the headspace was trapped onto a Tenax tube and analysed with Thermal Desorption GC-MS.

Laboratory 96150A (NOTE Response was handwritten, re-typed by FF)

Item 1:

Method 6 (2018): Headspace Concentration, Passive Separation and concentration of ignitable liquid residue from fire debris samples.

0830 hr 05.09.19 – 0945 hr 06.09.19 @ 70°C

- extract with ~1.5ml diethyl ether (06.09.18)

Method 9 (2018) Gas chromatography – Analysis of ignitable liquid residue in extracts from samples of Fire Debris.

- 1 µl injection 06.09.19.

COMMENTS with respect to examination/ analysis

Aviation gasoline

HC range C5-C12

Predominant Ion profile: Alkanes

Classification Miscellaneous.

Laboratory 96150T

Examination:

The exhibit was analysed by dynamic headspace sampling gas chromatography with mass spectral detection, heated dynamic headspace sampling gas chromatography with mass spectral detection and liquid solvent extraction with mass spectral detection.

Head space examination 23/08/2019

A Photoionisation Detector (PID) was exposed to the headspace of the carpet, to determine whether an ignitable liquid appeared to be present and if present, to estimate the volume of headspace required for analysis. The carpet exhibit produced a response of ~2,000ppm, therefore 5ml headspace was initially sampled.

A strong isoparaffinic profile falling between the c6-c8 carbon range was detected along with a very low concentration of aromatic substances falling between c7-c10. The low level aromatics were identified at abundances below our level of reporting.

The chromatogram of the exhibit was compared to chromatograms of standards to identify the presence of ignitable liquid residues.

The profile obtained did not correspond exactly with standards currently held by our organisation.

Further analysis was conducted taking a larger volume of air so as to determine if a better profile of the aromatic compounds could be obtained.

Head space examination 20/09/2019

50ml head space taken and run by GC/MS.

The chromatographic profile obtained still consisted of the branched alkanes, however at a lower concentration, but the aromatic profile was much more distinct. Toluene, ethyl benzene, xylenes, ethyl-methyl-benzene and tri-methyl-benzenes all present. Tetra methyl benzenes and naphthalene were not present at a level sufficient for reporting.

Head space examination 23/09/2019 & 26/09/2019

Repeat sampling of 50ml HS was conducted at both room temperature and heated at 50^oc to try and obtain a better profile of the heavier compounds (larger molecular weight) in the sample. A similar chromatographic profile to that produced on the 20/09/2019 was obtained.

Mimicking of packaging blank

A sample of the packaging material was cut from the supplied bag, heated/melted/burnt and placed into a 2l tin to equilibrate for 1hr. PID response 1ppm, 200ml head space taken. Nil ILR detected.

Weathering experiments 30/9 & 1/10/19

Sample was removed from packaging and weathered for different time intervals to determine if greater clarification of larger molecular weight compounds could be improved.

Nil improvement. Compounds present eventually disappeared.

Liquid extractions 30/9 & 1/10/19

Liquid extraction of charred and uncharred areas of carpet piece conducted to determine if any baseline interference from substrate. Nil detected.

Comments with respect to examination / analysis

Note: the PID device relates the concentration of volatiles detected to ppm of isobutylene. Sensitivity is less for aliphatic than aromatic compounds, therefore the accuracy of the device is limited.

RESULTS

Laboratory 47496

The following volatile components have been found:

- *Aliphatic hydrocarbons (mainly branched, some straight and cyclic) in the range of approximately C6-C12.*
- *Aromatic hydrocarbons, such as toluene and higher alkyl-benzenes.*

Laboratory 96150A (NOTE Response was handwritten, re-typed by FF)

Result:

*Toluene > 2,2,3,3 tetramethyl butane > 2,3,4 trimethyl pentane > 2,4 dimethyl hexane, 2,2,5 trimethyl hexane, ethyl benzene, xylene, 1 ethyl 2 methyl benzene, 1,2,3 trimethyl benzene.
-----→ aviation gasoline*

A moderately evaporated light petroleum distillate, such as aviation gasoline (or similar type of product) was detected on the carpet (Item 1).

Laboratory 96150T

(Results section not included in submitted report, results are included in Examination/ Analysis, see above (FF))

CASE ANALYSIS, INTERPRETATION and CONCLUSIONS

Laboratory 47496

INTERPRETATION

The combination of the presence and the patterns of the aliphatic and aromatic hydrocarbons that have been found in item1 are characteristic for gasoline.

CONCLUSION

Volatile components have been found in item 1 which originate from gasoline.

Laboratory 96150A (NOTE Response was handwritten, re-typed by FF)

CONCLUSION

Volatile components have been found in item 1 which originate from gasoline.

If we attended the scene:

In my opinion, the cause of the fire was the ignition of available combustible materials, including the carpet, assisted by the presence of a light petroleum distillate such as aviation gasoline (or a similar type of product).

IF samples submitted to the laboratory:

The partly burnt carpet (item 1) was analysed with respect to the possible presence of flammable or combustible liquid. A moderately evaporated light petroleum distillate, such as aviation gasoline (or a similar type of product) was detected on the carpet

Laboratory 96150T

Conclusion

Flammable hydrocarbons were detected.

Some of the hydrocarbons identified are normally associated with ignitable liquid products such as Avgas, petrol, paint thinners and degreasers etc, however comparison with standard products held by this laboratory and in-house criteria for reporting it was not possible to determine an exact source.

Due to the absence of blank control packaging and blank control carpet, there is a possibility that the results obtained can be attributed to these components. However, attempts to recreate blanks from the materials submitted suggests this is unlikely to be the case.

PART 2

Comment on any results obtained from the Carbon strip included.

Laboratory 47496

The carbon strip was extracted with 1 ml of n-pentane. The pentane extract was analysed with GC-MS. Some aliphatics (e.g. 2,2,4-trimethylpentane, 2,3,4-trimethylpentane) and a small amount of toluene have been found in the extract of the carbon strip.

Comments

We suggest to use AMPAC bags.

Laboratory 96150A (NOTE Response was handwritten, re-typed by FF)

Carbon Strip

Method 5 (2018): Solvent extraction.

Extracted with ~1.5ml diethyl ether 06.09.19

Method 9 (2018): Gas chromatography 1 μ l inj. 06.09.19

- lower levels of aviation gasoline.

Comments

Maybe need to look at more suitable bags as avgas was detected on the carbon strip outside the bag.

Laboratory 96150T

Examination of carbon strips by solvent extraction is not usually conducted within this laboratory.

Carbon strip extracted with CH₂Cl₂ and run on GC/MS. Dominant branched alkanes and very low concentration of aromatics identified. Similar to headspace results as of the 23/08/2019. This suggests that the internal packaging was not air-tight.

It is unknown if the compounds identified have leaked from the internal packaging, are attributed to the packaging or from contamination prior to packaging.

Comments

It would be preferential to submit blank packaging controls and blank substrate controls.

It is the policy of this laboratory that these controls should be submitted along with any exhibits for ignitable liquid examination. If this exhibit had been submitted as a part of casework a non-compliance would be raised, because no blank control of the carpet was submitted.

Conclusion and Summary of the Test

The aim of this test was to examine the end-to-end forensic examination and analysis process. To minimise extraneous elements influencing the interpretation, limited contextual information was provided to the participating laboratories.

Items were sealed in tamper evident bags and included descriptors for continuity purposes.

The Forensic Science laboratories were provided with a sample of burnt carpet in a sealed plastic bag. This bag was within another, inside which was a carbon test strip.

A similar piece of singed carpet was treated with a 50µl aliquot of Premium Unleaded Petrol (~6 weeks old), reduced to ~50% volume by burning (see Manufacturer's Instructions). Prior to its concentration, the petrol was stored in a plastic jerry can that had been used previously to store diesel.

Before items were despatched to participants a number of items of the same type as despatched were tested to determine whether loss of volatiles took place during road and air transportation. To accomplish this, carbon strips in the outer bags were extracted with dichloromethane (800 µL) and then analysed using GC-MS. The carpet samples within the inner bags were removed, transferred to clean 1 L Schott bottles and their headspace was sampled using an activated carbon granule at 60° C for about 12-14 hrs. The granules were then extracted with dichloromethane (200 µL) and analysed using GC-MS. The operating conditions for analysis were as follows: an Agilent 7890 gas chromatograph equipped with a 5975 triple-axis mass spectral detector equipped with an Agilent 19091S-433 column (5% phenylmethylsilicone) 30 m x 250 µm x 0.25 µm. MS data were recorded in electron ionization mode at 70 eV (scan range 40 m/z - 550 m/z). Splitless injection was used with an injection port temperature of 300°C. Flow was held constant at 1 mL/min with He carrier gas. The oven program was 40 °C held for four minutes, then ramped at 10 °C/min to 200 °C. The table below presents the results of pre-trial testing. Results for Road 1 and Road 3 (samples shipped by road) and Air 1 (sample shipped by air) indicate that some break-through of volatiles from the inner packaging was taking place. This phenomenon was confirmed by participants in the trial. Road 2 was a negative control, therefore flammable liquid residues were not expected to be present in either the inner or outer bags, and none was detected.

Preliminary results from samples transported using both road and air.

| Label | Packaging/ markings (<i>inter alia</i>) | RESULTS |
|--------|--|---|
| ROAD 1 | Bag within a bag, marked 'Burn trail between lounge and hallway' | DFLEX DEVICE: small trace of significant number of aromatics suggestive of petrol break-through CARPET HEADSPACE: mixture of weathered petrol and diesel/lamp oil (heavy petroleum distillate) |
| ROAD 2 | Bag within a bag, no markings | DFLEX: nil CARPET HEADSPACE: no common ignitable liquid, likely pyrolysis materials |

| | | |
|--------|--|--|
| ROAD 3 | Evidence bag holding bag within a bag, marked 'Carpet between lounge and hallway' Note that the label on the inner bag was 'Doorway between long and hallway' | DFLEX: large trace of a significant number of aromatics suggestive of petrol break-through CARPET HEADSPACE: mixture of weathered petrol and diesel or lamp oil (heavy petroleum distillate) |
| AIR 1 | Bag within a bag marked 'Burn trail doorway between lounge and hallway' | DFLEX: moderate trace of significant number of aromatics suggestive of petrol break-through CARPET HEADSPACE: mixture of weathered petrol and diesel or lamp oil (heavy petroleum distillate) |
| AIR 2 | Evidence bag holding bag within a bag, marked 'Carpet between lounge and hallway' Note that the label on the inner bag was 'Doorway between lounge and hallway' | DFLEX: NIL CARPET HEADSPACE: mixture of weathered petrol and diesel or lamp oil (heavy petroleum distillate) |

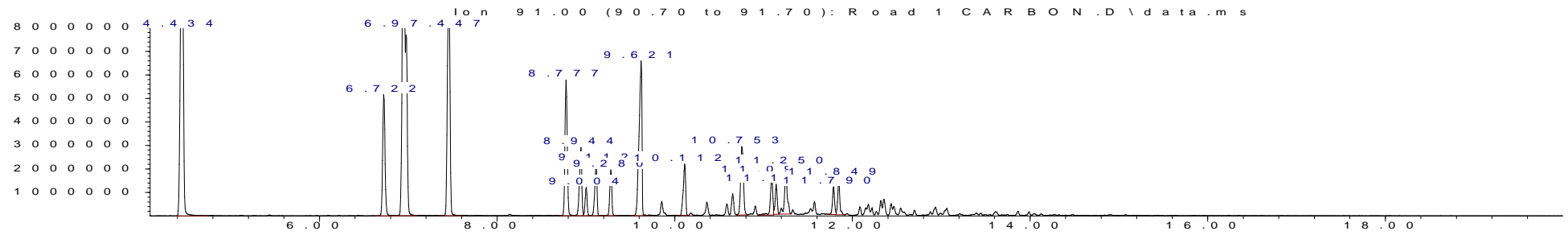
NOTE: Sample "Road 2" was a blank sample

Figure 1 shows typical total ion and extracted ion responses for one of the samples (Road 1) for which a positive response was expected. As can be seen from the extracted ion chromatograms (m/z 91, 105 and 120) the abundance of aromatic compounds detected in the headspace was significant. Peaks appearing at 15.880, 17.15 and beyond are due to straight-chain aliphatics that indicate the presence of a heavy petroleum distillate (such as diesel) in the sample, which is confirmed by the extracted ion chromatogram for m/z 57. Although a peak is present in the extracted ion chromatogram for m/z 208, the signal at 5.674 min is not due to tetraethyllead, which should elute close to toluene (4.434 min). Instead the signal is a minor peak in a spectrum that has an abundant peak at m/z 208, which suggests column bleed. Despite the abundance of branched-chain aliphatics in the samples (for example trimethylpentane at 4.195 min, trimethylhexanes near 7 min and trimethyloctanes between 9 and 11 min, evident in the m/z 57 extracted ion chromatogram) the absence of tetraethyllead and the abundance of heavy (C3) aromatics support the hypothesis that unleaded petrol is present rather than a leaded grade such as aviation gasoline.

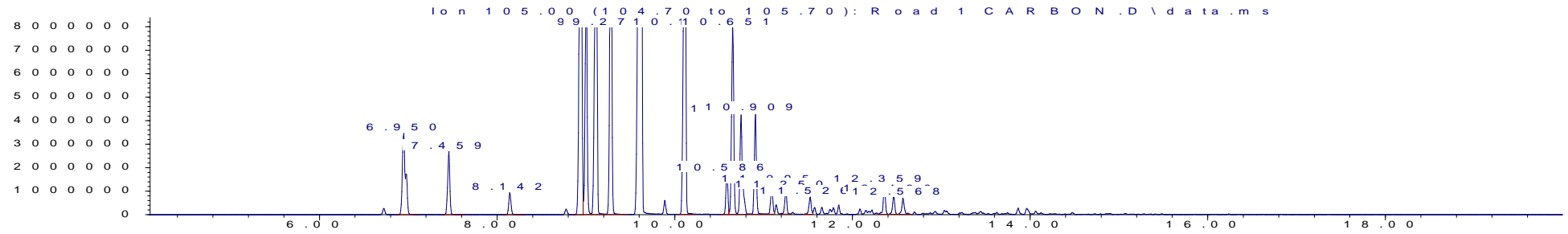
Note: See Chromatograms below. (higher resolution graphs may be available if required.)

As this is a collaborative trial, an assessment of the results was not made. It is recommended that the participating laboratories review the data against the chromatographs provided. If a laboratory wishes to have their data externally reviewed, please contact Forensic Foundations.

Abundance

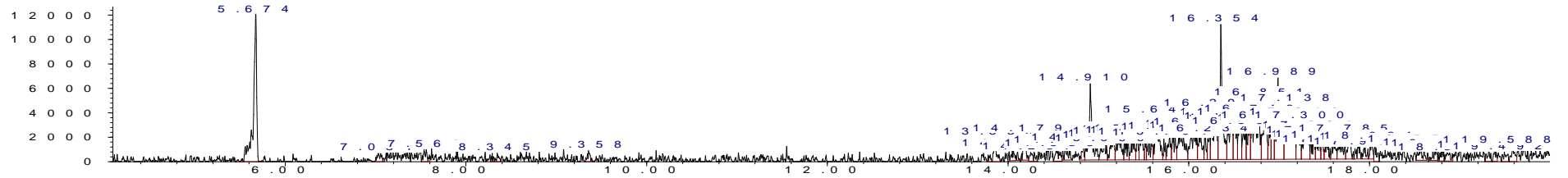


Time-->
Abundance

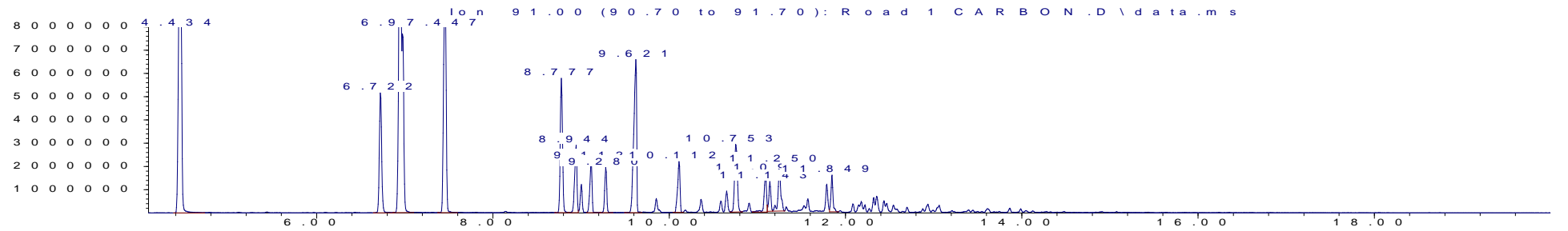


Abundance

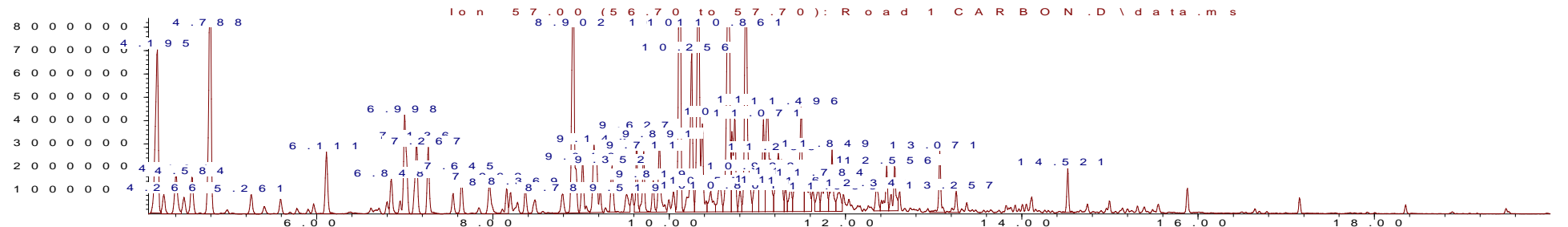
Ion 208.00 (207.70 to 208.70): Road 1 CARBON.D\data.ms



Time -->
Abundance



Time -->
Abundance



Time -->

Comments To Test Recipients

All facilities provided an accurate description of the sample on receipt. Facilities 96150A & 96150T included a complete description of the sample packaging and labelling.

APPENDIX A**Form No: WEF-03-A****Proficiencytesting@forensicfoundations****PROGRAM PLAN**

| | | |
|---|---|--|
| Program | Ignitable Fluid Residue- Interlaboratory collaborative study | |
| Round | 2019-7 | |
| Advisory Group | | |
| Program Coordinator /Technical Manager | Mr Dale Parsell Quality Manager Forensic Foundations PO Box 2279 North Ringwood, 3134 | |
| Discipline specific expert(s) | Prof K. Paul Kirkbride Professor of Forensic Science School of Chemical and Physical Sciences Flinders University GPO Box 2100 Adelaide, SA 5001 | |
| Providers(s) | Forensic Foundations PO Box 2279 North Ringwood, Victoria 3134 | Initial sample collection & test production. Results interpretation and reporting. |
| | Sample distribution to government facilities within Australia & NZ by ANZPAA-NIFS, 637 Flinders St Docklands | |
| Aims/Objectives | The aim of the program is to assess the laboratories' ability to competently analyze and interpret samples of ignitable fluid residue. The program will also enable the collection of information on the effects of transport and other variables on the results. | |
| Purpose | To assist the laboratories by ensuring their methods/procedures are performing adequately. | |
| Program Design | | |
| Number of Rounds | 1 | |
| Number and type of samples | 1 sample of carpet (and 1 x Activated Carbon strip | |
| | Samples are: <ul style="list-style-type: none"> • Petrol (Premium ULP) on a carpet substrate | |
| Hazards involved | Normal safe handling precautions should be taken when handling unknown volatile chemicals. | |
| Scenario | A fire occurred in a residential dwelling. A sample of the carpet was collected as the burn patterns indicated that it may have been deliberately lit. Participants will be provided with the sample of carpet | |
| Range of values/assigned values | It may be feasible for participants to arrive at chemical composition more detailed than the broad identification of the class of sample, care will need to be taken in interpreting results when "trade names" are used to identify materials | |

| | |
|--|---|
| Traceability/origin of assigned values | See above |
| Design and Methods | See Manufacturing Instructions |
| Selection Criteria | Unknowns to be selected from common ignitable fluids |
| Potential Major Sources of Error | Potential sources of error are leakage of ignitable fluid residue during transport, failure to extract the residue on receipt, failure to correctly identify the fluid. |
| Participants | Chemical Criminalistic laboratories |
| Reporting Criteria, Accuracy | NA |
| Analysis | Correctly identify chemical composition a sample provided and interpret. |

| | |
|------------------------------------|--|
| Pre-testing | |
| Homogeneity Testing and criteria | See Manufacturing Instructions |
| Stability Testing and criteria | NA – |
| Technical Review (internal) | |
| Participant Instructions | |
| Results Sheet | Provide copy of Results Sheet and evidence of Technical Review |
| Report | Include copy of Report and evidence of Technical Review |

| | |
|---------------------------|--------------------------------------|
| Sample Preparation | |
| Special conditions | Nil |
| Storage requirements | Room Temperature in arson bags |
| Distribution requirements | Distributed via Forensic Foundations |
| Sample checks | NA |

| | |
|--------------------------------------|---------------------------------|
| Program Dates | |
| Invitation letter | August 2018 |
| Sample distribution | First week July 2019 |
| Results due | 27 th September 2019 |
| Manufacturing Information to be sent | 11 th October 2019 |
| Final report due date | First week December 2019 |

| | |
|-----------------------------|---|
| Statistical Analysis | |
| Homogeneity Testing | NA |
| Stability Testing | See manufacture's instructions |
| Data Entry | Include evidence of data entry checks in file |
| Review by Statistician | NA |

| | |
|------------------|----------------|
| Reporting | |
| Report No: | 7/2019 |
| Master copy | Reports folder |

| | |
|--------------|---------|
| Availability | Website |
|--------------|---------|

Program Coordinator signature: DGP

Date: 11/6/19

Proficiencytesting@forensicfoundations
Inter-laboratory Collaborative Trial
Ignitable Fluid Residues 2019-7

Thank you for participating in this Inter-laboratory Collaborative Trail. We hope that you find this test useful and welcome any feedback which can be used in the design of further Proficiency Tests.

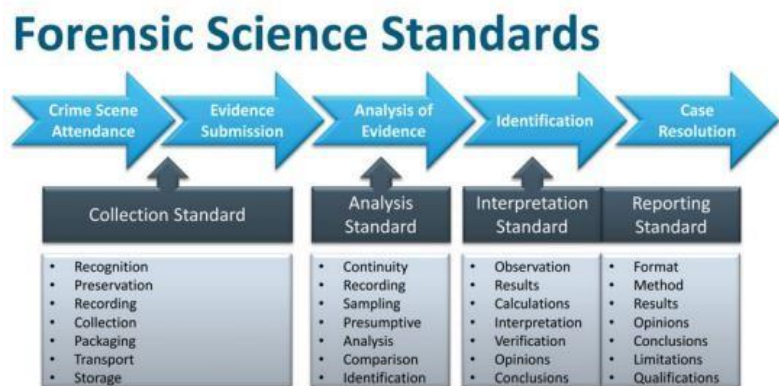
There are two parts to this trial:

1. You have been provided with a sample of carpet which was ‘collected’ from a domestic fire scene. The sample of carpet has been sealed in an arson bag, and then sealed within a tamper evident bag. You have also been provided with the case scenario and the results sheet. This part of the test mimics the structure of future ignitable fluids proficiency tests.
2. As there are a number of issues related to the storage and transport of ignitable fluid residues (especially when transported by air), this trial also includes intermediate packing and the inclusion of a carbon strip to monitor any leakage from the inner arson bag.

In addition to this exercise being a test of the transportation issues, it can also be used as a test of your laboratory procedures using controlled items. We also anticipate that it will enable participants to evaluate the quality of their analytical results against those from other laboratories and observe the terminology used in other laboratories / countries, how other laboratories express their opinions or advice to clients. To enable this, we request that participants submit the following:

- A glossary of terms used;
- An outline of the methodology used; and
- Their opinion in the format that they would provide to court.

Forensic Foundations’ Proficiency Tests are designed to test the end-to-end forensic examination process. The AS5388 and the ISO21043 series of Standards describe the forensic examination process from collection to reporting. This figure² illustrates the inter-relatedness of all steps in this process and was used as the basis of the Australian Standards’ development. The figure is also used as the basis of the development of Forensic Foundations’ Proficiency Tests.



² James Robertson, Karl Kent & Linzi Wilson-Wilde (2013) The Development of a Core Forensic Standards Framework for Australia, Forensic Science Policy & Management: An International Journal, 4:3-4, 59-67

Thus, all Forensic Foundations' Proficiency Tests commence with item collection and/or receipt and all the subsequent examination / analysis steps, culminating in the reporting, therefore reflecting actual forensic casework.

Attached you will find the case 'Examination Request and Item Submission' form and the test commences with the receipt of the items followed by your routine processes- item description, examination, analysis and interpretation.

The information submitted to the laboratory on the examination request form will direct what testing needs to be undertaken. Please use the attached results sheets. Additional pages may be added if required. An electronic copy of the results sheet can be downloaded from <https://www.forensicfoundations.com.au/download/>

The results sheets should be returned to Forensic Foundations by Friday 4th October 2019. Hardcopy can be returned to PO Box 2279, Ringwood, Victoria, 3134, Australia or a soft copy can be uploaded to <https://www.forensicfoundations.com.au/upload/>

Qualitative feedback will be provided to participants. Feedback will be both participant-specific (i.e., whether a particular laboratory "got the right answer") and group specific (e.g., which techniques seemed to perform better than others), together with results relating to any leakage or other transport issues.

Following the conclusion of the testing participants will be advised of the expected results and details regarding the production of the test.

APPENDIX C

| | |
|--|---|
| EXAMINATION REQUEST AND ITEM SUBMISSION | EASTERN AUSTRALIAN POLICE SERVICE |
|--|---|

| | |
|---|------------------------------------|
| OFFENCE: | Arson |
| DATE OF OFFENCE | Tuesday 23 th July 2019 |
| BRIEF STATEMENT OF FACTS | |
| <p>A fire occurred at 23 Avis Ave, Smithville. It is alleged that the fire was started deliberately. The burn patterns indicated a possible trail caused by the deposit of an ignitable substance.</p> <p>A sample of carpet which included part of the trail was collected.</p> <p>The sample of carpet was collected from the doorway between the lounge and hallway.</p> | |
| ITEM SUBMITTED FOR EXAMINATION | |
| Item 1 – Sample of burnt carpet | |
| EXAMINATION REQUESTED | |
| <p>Analysis for presence of any ignitable fluid residues Identification of residue, if present Identification of the original substance used, if relevant.</p> | |

APPENDIX D

PROFICIENCY TESTING @ FORENSIC FOUNDATIONS IGNITABLE FLUID RESIDUE – COLLABORATIVE STUDY

MANUFACTURERS INFORMATION

Introduction

The aim of the program is to assess the laboratory's ability to detect the presence of an accelerant and identify the possible accelerant used in a building fire.

Scenario

A fire occurred in a residential dwelling. A sample of the carpet was collected as the burn patterns indicated that it may have been deliberately lit. Participants will be provided with the sample of carpet

Test production

Test samples were produced by Forensic Foundations.

A portion of carpet was prepared by sectioning a carpet into rectangles approximately 10 Centimeters Centimeters.

This was then burnt using a butane torch down the middle to provide a trail of burnt carpet.

100ml of petrol (Premium ULP ~ 6 weeks old, see note below) was measured using a measuring cylinder.



Note: Fuel container used may have had traces of Diesel fuel.

This mixture was then burned in a metal container to reduce the volume of fluid to approximately 50%, extinguished and allowed to cool. 50ml was recorded as the final volume using a measuring cylinder

After cooling, a 50 μ l aliquot of the reduced mixture was then added to the carpet.



The section of carpet was immediately inserted into an arson evidence collection bag* and heat sealed. This bag was labelled, signed and dated. This arson evidence bag was then placed in a second arson evidence bag along with an activated carbon strip and again heat sealed.

* **NOTE: Arson evidence collection bags, 5" x 10" (12.5cm x 25cm) x 0.5mm, manufactured by SIRCHIE, pack of 100, purchased from Optimum Technology**

These bags were then placed into a tamper evident bag with details of the carpet.

Samples to determine the homogeneity and stability of the test were retained for testing:

- a) when other samples are sent out and
- b) 3 months after completion of the test.

20 samples were produced. 6 will be internally tested at these designated time periods. 4 will be tested when the samples are sent out and 2 approximately 3 months after the completion of the test.

Results of the final tests will be available upon request.



END OF DOCUMENT

Ignitable Fluid – Collaborative Study 2019-7 Feedback

Forensic Foundations prides itself in providing flexible fit-for-purpose forensic programs. This Challenge Test was the second developed by Forensic Foundations and thus the second undertaken by forensic laboratories. The manufacture, distribution and assessment and reporting of this test has provided, and will provide the basis for continuous improvement for both Forensic Foundations and the forensic laboratories. To this end we would appreciate your comments to assist us to improve the tests.

Please tick the appropriate box and make any relevant comments.

| | Strongly Agree | Agree | Disagree | Strongly Disagree | NA |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1. The test was too basic for our facility | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | | |
| | | | | | |
| | | | | | |
| 2. The samples supplied were suitable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | | |
| | | | | | |
| | | | | | |
| 3. The results required were not outlined sufficiently | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | | |
| | | | | | |
| | | | | | |
| 4. The final report provided suitable detail | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | | |
| | | | | | |
| | | | | | |
| 5. The tests involved should be more challenging | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| | | | | | |
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Please comment briefly on the following:

6. Are there additional aspects which could be included in the test?

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7. Any additional comments

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8,. Facility (optional)

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9. Would you like us to contact you to discuss your feedback?

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Forensic Foundations' Proficiency Tests are required to be fit-for purpose. To assist us to provide the relevant tests, please use the following form to suggest further tests for development.

Recommendation for Proficiency Test development

| | | |
|--|-------|--|
| Contact | Name | |
| | Email | |
| | Phone | |
| Discipline/ subdiscipline | | |
| Specific issues(s) to be addressed*. Note: The tests can be designed to be multidisciplinary. | | |
| Suggested technical advisor (if known) | | |
| Suggested manufacturer (if known) | | |

* All Proficiency Tests will include the end to end process (receipt & continuity, triage, description, examination, analysis, data generation, interpretation, reporting) but one aspect may be of particular interest/focus.

This form can be emailed to quality@forensicfoundations.com.au or you can discuss your suggestions on either 03 9018 8919 or 042