



Forensic Science Regulator Guidance

**Alcohol Back Calculation for Road Traffic
Investigations**

FSR-G-220

Issue 2

© Crown Copyright 2020

The text in this document (excluding the Forensic Science Regulator’s logo and material quoted from other sources) may be reproduced free of charge in any format or medium providing it is reproduced accurately and not used in a misleading context. The material must be acknowledged as Crown Copyright and its title specified.

1. PURPOSE

- 1.1.1 The Forensic Science Regulator (the Regulator) is working with the United Kingdom and Ireland Association of Forensic Toxicologists (UKIAFT) in relation to the standards for forensic toxicology.
- 1.1.2 Issues have arisen in relation to when it is appropriate to perform alcohol back calculation.
- 1.1.3 The Regulator is not, at present, in a position to specify when such calculations are reliable but believes it appropriate to issue guidance to ensure the Criminal Justice System is properly advised as to the issues with such calculations.

2. SCOPE

- 2.1.1 This document provides guidance on the approach to alcohol back calculations for road traffic investigations where the time between the incident of interest and the reported last drink is one hour or less.

3. MODIFICATION

- 3.1.1 This is the second issue of this document. It was prepared to update the document to reflect changes in the Criminal Procedure Rules (CrimPR) and the Criminal Practice Directions.
- 3.1.2 Significant changes to the text have been highlighted in grey
- 3.1.3 The modifications made to create Issue 2 of this document were, in part, to ensure compliance with The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018. ¹
- 3.1.4 The Regulator uses an identification system for all documents. In the normal sequence of documents this identifier is of the form 'FSR-#-###' where (a) the '#' indicates a letter to describe the type or document and (b) '###' indicates a numerical, or alphanumerical, code to identify the document. For example, the Codes are FSR-C-100. Combined with the issue number this ensures each document is uniquely identified.

¹ To facilitate compliance with the Regulations changes to the document are noted here. The following sections of the document have been changed -3.1.1, 3.1.2, 3.1.3, 3.1.4, 3.1.5, 3.1.6, 5.3.3, 5.4.3.c, 8 and 9. The following footnotes have been altered – 1 and 2.

3.1.5 In some cases, it may be necessary to publish a modified version of a document (e.g. a version in a different language). In such cases the modified version will have an additional letter at the end of the unique identifier. The identifier thus becoming FSR-#-####.

3.1.6 In all cases the normal document, bearing the identifier FSR-#-####, is to be taken as the definitive version of the document. In the event of any discrepancy between the normal version and a modified version the text of the normal version shall prevail.

4. IMPLEMENTATION

4.1.1 This guidance was published on 22 September 2020.

5. GUIDANCE

5.1 Alcohol Back Calculation

5.1.1 Back calculation is the process whereby a forensic toxicologist uses the concentration of alcohol in a blood or breath sample to calculate the concentration of alcohol in the individual's blood or breath at some time before the sample was taken. This type of evidence appears regularly in road traffic investigations. A relatively common example is where the concentration of alcohol in blood taken from the suspect is used to determine whether they were over the drink drive limit at an earlier time – perhaps when a collision occurred.

5.2 Nature of the Calculation

5.2.1 When a person begins drinking the concentration of alcohol in their blood will increase until such time as the rate of elimination equals the rate of absorption. The concentration will then begin to decrease at a reasonably predictable rate. It is therefore possible for a forensic toxicologist knowing the concentration of alcohol in a blood or breath sample to perform a back calculation to determine the concentration of alcohol in the person's blood or breath at some earlier time.

5.2.2 This process is, however, based on the assumption that over the period between the time of interest and the time the sample was taken the alcohol concentration in the person's blood is decreasing. If this is not true then the

result of the back calculation may be inaccurate. It could significantly overestimate the alcohol concentration.

5.2.3 It follows that back calculation should not be performed if it is likely the alcohol concentration was not decreasing for the whole calculation period.

5.3 Time Since Drinking

5.3.1 The UKIAFT, which acts as a professional association for forensic toxicologists, has produced guidance on this matter [1]. The view of the UKIAFT is that the concentration of alcohol in the blood can continue to increase for between 30 minutes and two hours after the last drink. The view of the profession is that a period of one hour after the last drink is the period within which the increase in alcohol should have ceased.

5.3.2 The UKIAFT takes the view that a back calculation where the time between the last drink and the incident is less than one hour would create a significant risk that the results of the calculation would be unreliable and overstate the alcohol concentration.

5.3.3 The UKIAFT guidance makes clear that back calculations should not normally be performed if the time between the last drink and the incident is less than one hour. The guidance is available from: ²

<http://www.ukiaft.co.uk/publications.html>

5.4 Evidence

5.4.1 Toxicologists should decline to perform calculations in circumstances where they believe the results would be unreliable, they should inform the instructing body³ in writing of the decision and be clear that this is disclosable. If the instructing body is aware of the fact its normal forensic toxicology provider does not perform the calculation then this is likely to be disclosable.

5.4.2 There are forensic toxicologists who are willing to perform back calculations in the circumstances described above.

² The URL was checked on 18 April 2020.

³ Even informal approaches to seek views whether a toxicologist would consider deviation from guidance should be responded to in writing.

5.4.3 The Regulator is not in a position, at this stage, to comment on the reliability of calculations which deviates from common practice. There are, however, comments that can be made.

- a. If a forensic toxicology provider declines to perform the back calculation because to do so would be unreliable, this is disclosable.
- b. The existence of the UKIAFT guidance, and the position set out on this form of calculation, is also disclosable.
- c. Any report by the toxicologist performing the calculation must address the following issues.
 - i. The toxicologist must provide sufficient information to allow the court to determine whether the methods employed are sufficiently reliable to be admissible [required by the CrimPR 19.4(h) and the Criminal Practice Directions (CPD)].
 - ii. Explain how the back calculation method was appropriate in the circumstances of the case [required by CPD 19.A.6(d)].
 - iii. The calculation is based on an assumption the alcohol concentration was decreasing through the period of the calculation. The toxicologist must explain why the assumption was valid in the circumstances of the case [required by CPD 19.A.6(b)].
 - iv. Whether the toxicologist's methods followed established practice in the field and, if they did not, whether the reason for the divergence has been properly explained, CPD 19.A.5(h). UKIAFT has issued guidance stating the circumstances when calculations should not normally be performed, therefore the toxicologist should explain the existence of the guidance why the calculations can be performed if they deviate from the guidance [required by experts disclosure obligations, CrimPR 19.4(f) & 19.4(h) and CPD 19.A.5(g)].
 - v. How the toxicologist's methodology has been validated; if this is the toxicologist's own methodology the validation should demonstrate how the method prevents overstating the alcohol concentration in cases involving the consumption of alcohol within one hour [required by CrimPR 19.4(a)].

- d. The evidence should have undergone a process of peer review and/or verification whereby the findings of the expert have been checked and/or verified by another competent expert.

5.4.4 More detailed guidance on the legal obligations on expert witnesses can be found in guidance issued by the Regulator [2].

6. NEXT STEPS

6.1.1 As noted above this guidance describes an approach which, without taking a stance on whether back calculation is appropriate in any given case, ensures the legal obligations of expert witnesses are maintained and the Criminal Justice System protected.

6.1.2 The issue of back calculation and time intervals will be the subject of further consideration and more detailed guidance issued in due course.

7. REVIEW

7.1.1 This document is subject to review at regular intervals.

7.1.2 If you have any comments please send them to the address or e-mail set out on the Internet at URL: <https://www.gov.uk/government/organisations/forensic-science-regulator>.

8. REFERENCES

- 1 UKIAFT Guidelines for Performing Alcohol Technical Defence Calculations, Version 3.0, UKIAFT, February 2019
- 2 Legal Obligations, FSR-I-400, Forensic Science Regulator.

9. ABBREVIATIONS AND ACRONYMS

Text	Meaning
CPD	Criminal Practice Directions
CrimPR	Criminal Procedure Rules
UKIAFT	United Kingdom and Ireland Association of Forensic Toxicologists

Published by:

The Forensic Science Regulator

5 St Philip's Place

Colmore Row

Birmingham

B3 2PW

<https://www.gov.uk/government/organisations/forensic-science-regulator>