

**REPORTABLE**

**IN THE HIGH COURT OF SOUTH AFRICA  
(WESTERN CAPE HIGH COURT, CAPE TOWN)**

Case No: CC46/2010

In the matter between:

The State

Vs

Clifford Joseph Hendricks

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**JUDGMENT DELIVERED ON THIS 9<sup>TH</sup> DAY OF SEPTEMBER 2011**

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**ERASMUS, J**

**Introduction**

1. The use of a road network, by vehicular means, has become the norm in our civilisation. This way of life poses its own inherent dangers to the safety and wellbeing of society. Appropriate measures must be put in place to ensure that any person who is in control of any mode of transport on our roads is at all times able to be in full control of such an instrument without any of his or her faculties being impaired.

2. It has become common that incidents on our roads occur that result in loss of life, serious injury to individuals and property that has a negative effect on the economy and wellbeing of the nation.<sup>1</sup> It is common cause that in an overwhelming majority of these incidents there are indications that the faculties of the driver and or pedestrians involved would have been affected by the presence of an intoxicating substance that affects the ability of such individuals to responsibly use the transport network<sup>2</sup>. This is a scourge that needs to be eradicated for the betterment of society at large.
3. It is important that this matter be addressed as it affects innocent sober users on South Africa's roads every day. It is a problem which is increasing and measures need to be in place to safeguard those using our public roads from the harms and dangers of those driving whilst their faculties are impaired.
4. The state ought to be able to utilise, to the full extent possible, all available tools at its disposal. If there is a tool available which both passes constitutional muster and requires a comparatively small allocation of resources, especially in light of the service delivery imperative and the concomitant competition for allocation of resources, it ought not only be used, but prioritised. As is clear from what I describe

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<sup>1</sup> According to the Medical Research Council (MRC) the following statistics were given; 53% of road users who die on South African roads had an alcohol level over the legal limit, the fatal accidents cost the country R 52 billion in 2007. South Africa is one of the highest alcohol consuming countries in the world and excessive alcohol consumption plays a major role in 60% of hospital trauma cases. An average of 40 people will die on South African roads every single day.

<sup>2</sup> Mr. D V Frost, during his examination as a witness, presented the Court with figures relating to alcohol use on the roads. He made the following statement in his affidavit submitted to the Court dated 17 May 2011. Para 23: "on (sic) National level it can be safely accepted that between over 50% of all driver fatalities are alcohol associated in that the driver had been drinking and driving. In the Western Cape this figure is even higher in that the driver fatality drinking and driving ratio is over 60%".

below there appears no reason, in principle, why an evidential breath test, properly applied, could not be such a tool.

5. Legislative enactments are in place to deal with this issue, the background, development and its application which I shall discuss in this judgment.
6. In this case, brought as a test case<sup>3</sup>, I primarily have to address the scientific reliability of the Dräger Alcotest 7110 MK 111 evidentiary breath testing device (*"the Alcotest"*<sup>4</sup>), used in South Africa to test the breath alcohol concentration of a person in an endeavour to combat the increasing number of drivers under the influence of alcohol. I further have to consider the adequacy of the Alcotest and the evidential value of the result it generates for use by the prosecution of accused persons in our legal framework.
7. The accused herein was charged with contravening section 65(5) read with sections 32, 65(6) and (7), 69(1), 73 and 89(2)<sup>5</sup> of National Road Traffic Act (the "RTA"), 93 of 1996 and regulations 115 and 332 of the National Road Traffic Regulations 2000 (G.G. 20973 of 2000) and read with section 25 of the Accreditation for conformity assessment, Calibration and Good Laboratory Practice Act, Act 19 of 2006.

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<sup>3</sup> As a test case I have been asked to deal with all the issues related to the Dräger Alcotest 7110 MK 111 as used in South Africa. The particular model used in this instance is designated "RSA" or "8314647" In as far as other models are concerned, I am unable to make specific findings.

<sup>4</sup> The device is referred to as the "instrument" as well as an "apparatus" in terms of the Dräger instructions for use manual; the "equipment" in terms of the Regulations and the RTA; and also the "machine" in the prosecution guidelines.

<sup>5</sup> I shall not deal with s69(1), 73 and 89(2) of the RTA as it has no bearing on the issues to be decided.

8. It is alleged that on 23 January 2010, on Greinhout Street, a public road in Kewtown Athlone, the accused wrongfully drove a motor vehicle with license number CA 373044, whilst the concentration of alcohol in any specimen of breath of the accused was not less than 0.24 milligrams of alcohol per 1000 millilitres. At the time of the alleged contravention, his breath alcohol concentration was 0.95 milligrams per 1000 millilitres, and such measurement was taken with equipment that complies with SANS 1793: Evidential breath testing equipment.<sup>6</sup>
9. The accused entered a plea of not guilty to the charge. In particular he placed the following in dispute:
- “2.1 that ...[he] was the driver of the vehicle CA 373044 on 23 January 2010;*
  - 2.2 that the alcohol on ... [his] breath exceeded 0.24 milligrams per 1000 millilitres of ... [his] exhaled breath;*
  - 2.3 that the testing apparatus used to determine the amount of alcohol on ...[his] breath:*
    - 2.3.1 functioned correctly;*
    - 2.3.2 was operated correctly;*
    - 2.3.3 was operated by a person who is properly qualified to operate such apparatus;*
    - 2.3.4 was calibrated correctly;*
    - 2.3.5 is capable of accurately determining the alcohol concentration on the breath of a test subject;*
    - 2.3.6 is capable of distinguishing between ethyl alcohol and other short chain carbon compounds;*
    - 2.3.7 was operated in accordance with the Dräger operation guidelines and/or with reasonable operation guidelines;*
  - 2.4 that section 65(5),(6) and (7) of Act 93 of 1996 conform to the requirements of the rule of law and the Constitution of the Republic of South Africa, namely the legislation rationally serves a legitimate purpose of government without vagueness, arbitrariness or capriciousness, in that:*

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<sup>6</sup> There were no alternative charges and I am therefore not able to make any findings related to the accused's impairment or his blood alcohol level.

- 2.4.1 *breath alcohol has no scientifically established direct correlation with a person's motor or perceptual skills and the ability of that person to drive a motor vehicle;*
- 2.4.2 *the correlation between breath alcohol and blood alcohol levels differs from individual to individual and therefore a conviction or acquittal may depend solely upon the type of test used and is therefore arbitrary and unreasonable."*
- 3. He made the following admissions in terms of section 220 of Act 51 of 1977:
  - 3.1 *"... [he] was taken to the Shadow Alcohol Examination Centre in Athlone where a test using a Dräger Breathalyser was carried out on ... [him] by Mr John Gaven at approximately 19h37;*
  - 3.2 *the machine used was the Dräger Alcotest 7110 Mk 111;*
  - 3.3 *... [he] consumed no alcohol between the time when ... [he] was arrested and the time that the aforementioned test described above was carried out on ... [him]"*.

10. The state therefore is challenged with proving, beyond a reasonable doubt<sup>7</sup>, the accused's guilt of contravening section 65(5) of the RTA as well as its own compliance with all the relevant regulations and further requirements relating to the Alcotest. The court will further have to be satisfied that the legislation conforms to the requirements of the rule of law and of the constitution.

### **The facts**

11. It was a warm summer's day in Cape Town on 23 January 2010. The accused together with his girlfriend and his daughter decided to fetch friends and spend time

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<sup>7</sup> Schwikkard *Presumption of Innocence* 15. In *S v Baloyi* 2000 (1) SACR 81 (CC) Sachs J also said at [15]: "The requirement that the State must prove guilt beyond a reasonable doubt has been called the golden thread running through the criminal law, and a prime instrument for reducing the risk of convictions based on factual error." See also generally *Magmoed v Janse van Rensburg* 1993 (1) SACR 67 (A), where Corbett CJ referred to the "general policy of concern for an accused person in a criminal trial" (at 100j) and the rule that there can be no conviction in the absence of proof beyond reasonable doubt furnished by the prosecution (at 101a).

on the beach. They consumed a few alcoholic beverages before going and more whilst on the beach.

12. Later in the day the accused was seen driving a motor vehicle in Kewtown, Athlone.

His driving was indicative of abnormality, at one stage he overtook a police vehicle on the wrong side and brought his vehicle to a standstill in a manner inconsistent with normal driving behaviour. The police observed the accused as he alighted from the driver's door of the vehicle, approached and apprehended him. The accused was undoubtedly under the influence of a substance which had a narcotic effect. It was placed in dispute that the accused was in fact driving the motor vehicle at any relevant stage. However on the totality on the evidence presented I have no hesitation to find that the accused was in fact the driver of the said motor vehicle<sup>8</sup>.

13. He was taken to the Athlone police station in the back of a police patrol vehicle. It is unclear whether the accused was body searched before being placed in the vehicle.

14. Upon their arrival at the police station it was discovered that the police were not in possession of the necessary equipment to ensure that a blood sample be taken. Absent the availability of the necessary available blood sampling kit, the accused was taken by the police to the Athlone Shadow Alcohol Examination Centre ("*Shadow Centre*") for a breath test to be conducted.

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<sup>8</sup> I do not deem it necessary to fully summarise the disputed evidence as my finding would not have any effect on the outcome of this case.

15. This particular Shadow Centre was opened, equipped with three Alcotests, in mid-December 2009 and controlled by the same manager<sup>9</sup> until mid-April 2010.
16. During that period, an occurrence book was kept on site for the purpose of recording all incidents related to the running of the Shadow Centre<sup>10</sup> - particularly in respect of the state and maintenance of the Alcotests. Evidence given however revealed that not all the incidents relating to these Alcotests were entered into this occurrence book. It therefore was difficult to establish when - if at all – any of these Alcotests were sent for calibration - or any routine maintenance, reported malfunction or faults: there was simply insufficient record keeping. I pause to add that the prosecution had great difficulty in tracing the records for court purposes.<sup>11</sup>
17. The officers<sup>12</sup> who operate the Alcotests are required to be trained in the effective and correct use thereof. The primary reason for strict adherence to operating procedures is that any results produced by the Alcotest could be used in a court of law. I shall refer to the training of these officers as operators later in this judgment.
18. A traffic officer<sup>13</sup> specifically trained to be an operator of the Alcotest, tested the accused with the Alcotest model number 8314647 and serial number ARZN-0051.

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<sup>9</sup> Mr. I Petersen.

<sup>10</sup> Inclusive of, *inter alia*, staff and general operational matters.

<sup>11</sup> This would be what provision 2.5 of the prosecution guidelines mentioned herein is intended to prevent.

<sup>12</sup> Prosecution guidelines provision 2.1 states that only "registered traffic officers" may operate the devices.

<sup>13</sup> Mr. J Gaven from Cape Town Traffic Services.

19. The accused was asked to blow one sample of breath into the Alcotest, whereafter a printout was produced. The result of the breath test reported a breath alcohol concentration of 0.95mg per 1000 millilitres. Since this was in excess of the legal limit of 0.24mg per 1000 millilitres, the accused was formally arrested and charged with the offence of contravening section 65(5) of the RTA.

20. It is indicative to note, at this stage, that only sparse information was obtained about the accused in relation to, *inter alia*, his intake of any substances or cigarette smoke, his body temperature and physical condition during the time of his detention and during the breath test.<sup>14</sup>

21. I pause to note that the accused was not asked whether or not he wears dentures. This would be a very important question to ask since there is a danger of a false 'positive' result in the presence of mouth alcohol as will become evident later in this judgment.

22. These facts have to be considered and measured against the legislative framework which I now deal with.

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<sup>14</sup> Officer Gaven's notes, entered into a form half a page long at the time of the accused's breath test, reflect the accused's personal details such as name and number, the make of the car and registration number thereof, when last the accused ate, and what type and quantity of alcohol he had consumed. From the sample "operator's statement" - some 3 pages long and including a detailed questionnaire - handed up by the state, it became clear that those were only some of the questions that ought to have been asked. No such document with the accused details was handed in as evidence.



## The legislative framework

23. An accused person is presumed to be innocent until proven guilty. Section 35 (3)(h) of the Constitution of the Republic of South Africa<sup>15</sup> states: *“Every accused person has a right to a fair trial, which includes the right - to be presumed innocent, to remain silent, and not to testify during the proceedings”*.<sup>16</sup> The State must prove, in a case like this, by admissible and credible evidence all the requirements set out in the legislation, viewed through the prism of the Constitutional framework.

24. In dealing with the charge I need to consider, in particular, section 65(5) of the RTA. However, it is important for the purposes of this case to consider section 65 in its entirety in light of the accused's plea. Section 65, titled *“Driving while under the influence of intoxicating liquor or drug having a narcotic effect, or with excessive amount of alcohol in blood or breath”*, reads as follows:

- (1) *“No person shall on a public road –*
  - (a) *drive a vehicle; or*
  - (b) *occupy the driver's seat of a motor vehicle the engine of which is running, while under the influence of intoxicating liquor or a drug having a narcotic effect.*
- (2) *No person shall on a public road –*
  - (a) *drive a vehicle; or*
  - (b) *occupy the driver's seat of a motor vehicle the engine of which is running, while the concentration of alcohol in any specimen of blood taken from any part of his or her body is not less than 0,05 gram per 100 millilitres, or in the case of a professional driver referred to in section 32, not less than 0,02 gram per 100 millilitres.*
- (3) *If, in any prosecution for an alleged contravention of a provision of subsection (2), it is proved that the concentration of alcohol in any specimen of blood taken from any part of the body of the person*

<sup>15</sup> The Constitution of the Republic of South Africa Act 108 of 1996.

<sup>16</sup> Of relevance will also be the limitations clause contained in section 36 of the same Act.

concerned was not less than 0,05 gram per 100 millilitres at any time within two hours after the alleged contravention, it shall be presumed, in the absence of evidence to the contrary, that such concentration was not less than 0,05 gram per 100 millilitres at the time of the alleged contravention or in the case of a professional driver referred to in section 32, not less than 0,02 gram per 100 millilitres. It shall be presumed, in the absence of evidence to the contrary, that such concentration was not less than 0,02 gram per 100 millilitres at the time of the alleged contravention.

- (4) Where in any prosecution in terms of this Act proof is tendered of the analysis of a specimen of the blood of any person, it shall be presumed, in the absence of evidence to the contrary, that any syringe used for obtaining such specimen and the receptacle in which such specimen was placed for despatch to an analyst, were free from any substance or contamination which could have affected the result of such analysis.

**(5) No person shall on a public road-**

**(a) drive a vehicle; or**

**(b) occupy the driver's seat of a motor vehicle the engine of which is running, while the concentration of alcohol in any specimen of breath exhaled by such person is not less than 0,24 milligrams per 1 000 millilitres, or in the case of a professional driver referred to in section 32, not less than 0,10 milligrams per 1 000 millilitres.**

- (6) If, in any prosecution for an alleged contravention of a provision of subsection (5), it is proved that the concentration of alcohol in any specimen of breath of the person concerned was not less than 0,24 milligrams per 1000 millilitres of breath taken at any time within two hours after the alleged contravention, it shall be presumed, in the absence of evidence to the contrary, that such concentration was not less than 0,24 milligrams per 1000 millilitres at the time of the alleged contravention or in the case of a professional driver referred to in section 32, not less than 0,10 milligrams per 1 000 millilitres, it shall be presumed, in the absence of evidence to the contrary, that such concentration was not less than 0,10 milligrams per 1 000 millilitres at the time of the alleged contravention.

- (7) For the purposes of subsection (5) the concentration of alcohol in any breath specimen shall be ascertained by using the prescribed equipment.**

- (8) Any person detained for an alleged contravention of any provision of this section shall not –

- (a) *during his or her detention consume any substance that contains alcohol of any nature, except on the instruction of or when administered by a medical practitioner;*
- (b) *during his or her detention smoke until the specimen referred to in subsection (3) or (6) has been taken, as the case may be.*
- (9) *No person shall refuse that a specimen of blood, or a specimen of breath, be taken of him or her."*

25. It is therefore incumbent upon the State, in order to sustain a conviction in terms of section 65(5), whether (a) or (b), to prove that the result produced was obtained by using the "prescribed equipment" as stated in section 65(7).

26. This "prescribed equipment" referred to in subsection (7) is prescribed<sup>17</sup> by Regulation 332, titled "*Equipment used in ascertaining concentration of alcohol in breath*", ("Reg 332"), and contained in GN R404 of 2007<sup>18</sup>, which was operational with effect from 4 May 2007.

27. Reg 332 as contained in GN R 404 provides that equipment intended to be used for the purposes of section 65(7) of the RTA must be approved in a specified way in accordance with requirements prescribed in South African National Standard 1793 ("SANS 1793"). It is noteworthy that no reference is made therein to any particular make or model of prescribed equipment as there had been previously in the 2003 version of Reg 332. The full text reads:

*"(1) For the purpose of this regulation type-approved and type-approval means that one example of a specific make and model of equipment has*

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<sup>17</sup> The Minister of Transport is empowered, in terms of s 75 of the RTA, to make National Road Traffic Regulations, ("*Regulations*") from time to time. The first thereof were published under GN R 225 in GG 20963 of 17 March 2000 to take effect on 1 August 2000.

<sup>18</sup> Published in GG 29865.

*been tested in terms of the South African National Accreditation System (SANAS), by an accredited test laboratory in terms of SANS 1793: Evidential breath testing equipment and a test report indicating compliance with such specification is issued in respect of such make and model of equipment.”*

*(2) The equipment to be used to ascertain the concentration alcohol in any breath specimen as contemplated in section 65(7) of the Act, shall comply with the requirements of the standard specification, SANS 1793: Evidential breath testing equipment and shall be type-approved as contemplated in subregulation (1).*

*(3) If, in any prosecution for an offence under section 65(5) of the Act, an allegation is made in the charge sheet, in relation to the prescribed equipment used to ascertain the concentration of alcohol in a breath sample, a certified copy of a test report, indicating that the specific make and model of equipment complies with SANS 1793, issued by an accredited test laboratory shall, in absence of evidence to the contrary, be prima facie evidence as to the fact that the equipment complies with the provisions of subregulation (2).*

*(4) A certified copy of a certificate issued by the manufacturer or supplier of the equipment referred to in subregulation (1), that contains the make and model of the equipment, shall, in absence of evidence to the contrary, be prima facie evidence that such equipment is of such make and model.”*

28.A further addition - inserted for the first time by GN R404 of 2007 - is Regulation 332A, (“Reg 332A”), titled “*Presumption regarding calibration or verification*

certificate for equipment used for road traffic law enforcement purposes”.<sup>19</sup> At the time of the accused’s arrest, it read as follows<sup>20</sup>:

*“Where in any prosecution for an alleged offence in terms of this Act, it is necessary to prove that any equipment used for road traffic law enforcement purposes, was calibrated or verified to establish the accuracy and traceability, of such equipment, a certificate issued by a laboratory that is accredited for the purpose of issuing such certificates and conducting the tests required for such calibration or verification, by the South African National Accreditation System (SANAS), shall in the absence of evidence to the contrary, by mere production thereof be prima facie evidence as to such calibration or verification.”*

29. As Reg 332 refers to SANS 1793 it is important to consider the contents thereof, to which I now turn.

30. SANS 1793 Edition 2, issued by the South African National Accreditation System (“SANAS”) in 2006 (“SANS 1793:2006”), is headed “Evidential breath analyzers” and on its title page states that “[t]his national standard is the identical implementation of OIML R 126:1998...”.<sup>21</sup>

31. While expressly incorporating OIML R 126:1998, it also expressly “cancels and replaces the first SABS<sup>22</sup> edition (SABS 1793:1998)”. In other words, SABS

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<sup>19</sup> Subsequent to its first publication in 2000, Reg 332 was substituted by:

1. GN R1341 of 2003, with effect from 25 September 2003;
2. GN R404 of 2007, with effect from 4 May 2007;
3. GN R1113 of 25 November 2010, which was in turn revoked by GenN 118 of 2 March 2011.

<sup>20</sup> The Reg 332A wording in any event remained unchanged.

<sup>21</sup> The acronym OIML, (Organisation Internationale De Métrologie Légale) in its English translation, stands for the International Organization of Legal Metrology.

<sup>22</sup> The South African Bureau of Standards, (“SABS”), type-tested the Alcotest under SABS 1793:1998 and issued a test report thereof on 18 February 1998. That document was handed in as Exhibit H11.

1793:1998, the first edition of the standard applicable to evidential breath analyzers was superseded by the second edition – SANS 1793:2006.

32. SABS 1793:1998 was presented as an Exhibit to this court, it was approved on 16 February 1998, the differences between this document and the OIML R 126:1998 are vast<sup>23</sup>.

33. In SANS 1793:2006 it is stated that “[f]or the purpose of this recommendation, only ethanol is considered alcohol”, which is also the definition used in OIML R 126:1998 (E) Edition 1 - the English language version of the first edition which is still in effect.

34. Because of the nature of this case, it is important that I summarise the salient features of the standard as presented in terms of the OIML R126.

35. In an attempt to satisfy the provisions of Reg 332 and prove compliance with OIML R 126:1998 the State produced a certificate from Dräger AG issued by the OIML on 18 May 2010 which certifies the ‘pattern’ 7110 MKIII as conforming to OIML R 126:1998, (“R 126”) .

36. This proffered OIML certificate does not make mention of either a particular model of that ‘pattern’ – specifically the model number 8314647 used in this case – or of any version of operating firmware or software whatsoever as having been tested.

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<sup>23</sup> SABS 1793:1998 was the standard at the stage of the type testing, whilst OIML R 126 was the applicable standard at the time of the alleged offence.

37. According to this certificate of conformity the “principal characteristics” of this ‘pattern’ of evidential breath analyser are set out in the appendix thereto. This appendix in turn sets out the most important characteristic as follows: “*The Evidential breath analyzers Dräger MK 111 pattern measures the alcohol concentration by analysis of expired alveolar<sup>24</sup> air, using the phenomenon of absorption of a beam of infrared monochromatic radiation<sup>25</sup>.”<sup>26</sup> The premise and mechanisms related to the workings of the machine will be discussed in detail below.*

38. The document referred to as R 126 is headed “International Recommendation” and titled “Evidential breath analyzers”, (“EBAs”). Its 39 pages contain a main body of 13 pages and 9 annexures. Annexures A – D are sub-headed “Mandatory” and Annexures G – I are sub-headed “Informative” while E and F do not have any sub-headings.

39. In terms of point 1.1 of the introductory section titled “Scope”, “for the purpose of this Recommendation, only ethanol is considered as alcohol”. Point 1.5 gives the further purpose of R 126 as being “to define the performance requirements of EBA’s and the means and methods employed in testing them.”

40. The section titled “Terminology” defines “[d]eep lung air” as “breath delivered from the mouth of a subject that originates from the alveoli of the lungs, normally referred

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<sup>24</sup> My emphasis. This point will be covered in detail below.

<sup>25</sup> My emphasis. This point will be covered in detail below.

<sup>26</sup> English text.

to as end-expiratory breath”<sup>27</sup> and defines “[a]lveolar air” in turn as “[a]ir contained in the pulmonary alveoli”<sup>28</sup>.

41. Point 3.9 provides technical details of devices<sup>29</sup> which may be used for “adjustment” of an EBA “to a standard” and the formula to be used therefor. The preferred method – listed first<sup>30</sup> – involves a so-called ‘wet bubble train’ whereby a “mixture of air and ethanol passes through the entire gas analysis train, starting with the mouthpiece, in the direction normally taken by exhaled air.”

42. That is followed by a note stating that “[a]djustment using dry gas is possible provided that the difference of effect between wet and dry gases is known or can be automatically corrected”.

43. The alternative method<sup>31</sup> is titled “adjustment by simulation”, indicating thereby that the dry gas method of testing is an alternative to the ‘wet bubble train’. It reads: “[a] device for adjusting the EBA by a procedure other than that specified in 3.9, notably by the simulation of the effects of the passage of a standard mixture of gases as described in 3.9”.

44. Section 5 is titled “Metrological requirements” and lists, in detail, what is required of the EBA in order for it to be compliant with the recommendation. There are details

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<sup>27</sup> Point 3.4.

<sup>28</sup> Point 3.5.

<sup>29</sup> Annexure G informs of “general examples” of such.

<sup>30</sup> At 3.9.

<sup>31</sup> At 3.10.



of “[m]aximum permissible errors”, “[r]epeatability”, “[d]rift” and “[m]emory and residual effect”<sup>32</sup>.

45. Factors which influence the operation of an EBA are listed as “[i]nfluence quantities” in section 5.5. Annex A - a ‘mandatory’ provision – lists the “test methods and factor values” to be used. Of particular importance are those not immediately apparent and which may cause an incorrect reading to be produced by the EBA. In other words, a power failure will not be of concern since there will not be a reading, but ethanol in the mouth is a concern because it will influence a reading.

46. Provision is made for the national authorities which specify the EBAs to be used in their jurisdictions to elect how those EBAs ought to perform if ethanol is detected in the “upper respiratory tract” of a test subject<sup>33</sup>.

47. The point made here resonates with the evidence led before me that the EBA (the Alcotest) in issue is, and can be, programmed in whichever way the national authorities order it to be. In South Africa, as discussed later it will become apparent that the Alcotest as used in this case was minimally equipped and programmed.

48. So-called ‘interfering substances’ are referred to under point 5.5.3 titled “[p]hysiological influence factors” and listed in detail in Annex C to R 126 – which is in turn labelled as being ‘mandatory’.

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<sup>32</sup> Points 5.1, 5.2, 5.3 and 5.4 respectively.

<sup>33</sup> Point 5.5.1 (c).

49. The 'mandatory' provisions of Annex C state that EBAs shall be tested for interfering substances by means of "dry test gas" – first of ethanol alone and then by means of ethanol to which only one of the list of given substances has been added at a time. There are nine substances listed and again there is a note that national authorities may choose to test the influence of other potentially interfering substances according to the prescribed protocol.
50. Physical influence factors and physical disturbances are listed in 5.5.2 and 5.5.4 respectively and covered in detail in Annex B and Annex D, both of which are 'mandatory'. These provisions relate to aspects such as ambient temperature and relative humidity, atmospheric pressure and presence of hydrocarbons in the environment, power supply, shock and electromagnetic disturbances.
51. Section 6 is titled "Technical requirements" and details the parameters within which EBAs may operate and still be compliant with R 126. I note that national authorities are advised in some instances that they may specify requirements over and above those provided for in R 126.
52. It is stated that "[t]he EBA shall be designed to ensure that measurements are made on samples of deep lung air"<sup>34</sup> and details follow which aim to ensure capture of such samples – the requirements for continuous, uninterrupted exhalation of a minimum quantity of air at a certain pressure and at a given flowrate.

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<sup>34</sup> Point 6.6.1.

53. There are prescribed details regarding safety, security and checking as well as fail-safe provisions where the EBA will not render a result and prevent continued use without the checking for correct operation. The national authority of a jurisdiction may require routine adjustments or checks “involving a given means”<sup>35</sup>.
54. Point 6.12, titled “Measuring cycle”, refers to “[a]dvisable provisions’ in Annex I and provides that “[n]ational authorities shall define what constitutes a measuring cycle, i.e. the set of operations which may permit the operator to conclude whether or not a person is under the effect of alcohol”.
55. Annex I is subheaded ‘informative’ as opposed to ‘mandatory’ and yet its two introductory paragraphs indicate that where the content of Annex I is not mandated, equivalent provisions ought to be prescribed. The text reads: *“Due to the physiological aspects of measuring ethanol and especially the possibility of ethanol being present in the upper respiratory tracts, the legal authority may require that EBA’s fulfil the provisions in this Annex. Where these provisions are not mandatory the legal authority should provide procedures with the aim of achieving an equivalent level of confidence in the validation of results.”*
56. The provisions of Annex I point 3 state the minimum requirements of “each measurement” which forms part of a determined measuring “cycle” – verification of a zero starting point and verification of correct operation of the EBA. These are points 6.8. and 6.9 respectively of R 126 itself.

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<sup>35</sup> Point 6.10.4.

57. Annex I presupposes a measuring cycle of two breaths spaced a minimum of two minutes apart in order to safeguard against false ‘positive’ results. It is debatable whether, in the absence of a second breath sample, an ECC as part of the Alcotest used in this case can function as a second test.

58. There is a provision titled “Minimum volume”<sup>36</sup>, which states: *“For EBA’s that do not monitor maximum mass concentration during exhalation, measurements shall imply an exhalation volume equal to at least 1.5L. This shall particularly apply to EBA’s that perform a measurement after a preset volume or period of time for exhaling.”*

59. There is a repeat warning about ethanol in the mouth at point 6.15.3 and a comment that “it may be sufficient to include this information in the user manual” – as opposed to an inscription on the machine itself regarding waiting time before a test which was previously recommended.

60. The “Practical instructions” section<sup>37</sup> mentions a logbook, what it ought to contain and how it is to be managed “[i]f the national regulation prescribes a metrological logbook”.

61. Section 8 is titled “Metrological controls” and provides for the criteria which inform “pattern approval”, “initial verification of new EBA’s” and “periodic verification”. I

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<sup>36</sup> Point 6.14.

<sup>37</sup> Section 7.

note that 8.1.5 refers to Annex E – the ‘pattern test’ report format<sup>38</sup> – which may be amplified according to “national preference” but the use of which “is mandatory in the framework of the OIML Certificate System”.

62. Point 8.1.2 refers to “[t]he user manual [which] shall be reviewed by the national responsible body for its completeness and clarity of operating instructions.” That point reads: *“The user manual shall be reviewed by the national responsible body for its completeness and clarity of operating instructions. The EBA and technical documentation shall be visually inspected in conjunction with a review of specification provided by the manufacturer to determine that requirements 6.1 through 6.16 are met.”* The deficiencies of the manual in the instant case will become apparent from what follows.

63. The same section<sup>39</sup> also provides for a routine test by a user<sup>40</sup> and “a chronological written record” of “at least the results of all routine tests” – “[i]f required by the national responsible body”<sup>41</sup>.

64. The methodology required to be followed for testing procedures follows in the final part<sup>42</sup> which is titled “Test method” and sets out some formulas to be used. There is reference to the ‘mandatory’ Annex B and Annex D and provision for test reports setting out the actual procedures followed in each case.

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<sup>38</sup> No test report in the format required by Annex E was ever entered as an Exhibit.

<sup>39</sup> Section 8.

<sup>40</sup> Point 8.4.2.

<sup>41</sup> Point 8.4.3.

<sup>42</sup> Section 9.

65. The salient point is that SANS 1793:2006 states that it is the identical implementation of OIML R 126:1998. That would imply that it has been adopted, in its entirety, as a standard to be followed in South Africa.

### **Prosecution guidelines**

66. In addition to the legislative framework as outlined above, the Directorate of Public Prosecutions, (“DPP”), added procedural guidelines directed at its staff in order to, *inter alia*, regulate matters not specifically provided for in terms of the legislative framework.

67. It is unclear in terms of which section of the National Prosecuting Authority Act<sup>43</sup> these guidelines were issued, therefore I am unable to rule on the effect in law they might have. The fact is that there are guidelines which have been put in place and cannot be ignored.

68. The November 2005 document<sup>44</sup>, handed up as part of the defence’s exhibits, titled ‘Prosecuting Guidelines for Evidentiary Breath Testing Machines (“EBTMs”)', (“the “Guidelines”’) is divided into two sections – the first titled ‘General Guidelines for Prosecution in Drunk Driving Cases’ and the second ‘Guidelines for Prosecution with Evidentiary Breath Testing Machines’.

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<sup>43</sup> The National Prosecuting Authority Act 32 of 1998.

<sup>44</sup> It seems to be the most recent one and supersedes the one issued by the Director of Public Prosecutions: Cape of Good Hope which was also part of the defence’s exhibits.

69. In the second section, which deals specifically with the use of “EBTMs”, consists of five sub-sections which read:

*“2.1 The equipment may only be operated by a registered traffic officer who must have passed an operator’s course for the particular model of the machine and must be issued with an operator’s certificate of competence.*

*2.2 The operator must keep in his/her possession the operator’s certificate for the equipment in question or a certified copy.*

*2.3 Only the equipment which complies with Regulation 332(4) of the Regulations in terms of the national Road Traffic Act may be used. Equipment must be calibrated at least once every six months by an accredited laboratory and a calibration certificate issued. A certified copy of the calibration certificate shall be available on site. Equipment that is outside the six month period must be recalibrated before it may be used for calibration purposes.*

*2.4 After maintenance and repair of the equipment, it must be recalibrated.*

*2.5 All calibrations, maintenance and repairs shall be recorded in an appropriate service record, which is kept for each unit.”*

70. On the page following subsection 2.5 there is an example of an ‘equipment service record’ as well as an example of an ‘occurrence register’. No such documents were handed up as exhibits during this trial.

71. Evidence was led that the component of the Alcotest which measures the absorption of the infrared monochromatic radiation referred to in R 126 above is calibrated by the National Metrology Institute of South Africa (“NM/ISA”). This is done by the ‘dry gas’ method referred to in R 126 above<sup>45</sup> as an alternative to a ‘wet bubble train’ which is designed to simulate a person’s breath.

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<sup>45</sup> 3.9 and 3.10 of R 126.

72. It became clear that calibration of the second, additional, component of the Alcotest is not performed by NMISA since the 'dry gas' method would lead to damage of this component.

73. The calibration is to be done by an accredited laboratory, which will perform the testing of the Alcotest and issue the certificates demonstrating compliance with SANAS' standards, SANS<sup>46</sup>, and according to the Guidelines<sup>47</sup> that calibration must be done at 6 month intervals. The only other reference to the calibration interval of 6 months is found in Dräger's Alcotest instruction manual<sup>48</sup>. The Guidelines also state that there must be recalibration after repair and maintenance is done on any Alcotest<sup>49</sup>.

74. The science, which is common cause and on the basis of which these offences were created, becomes more important in the light of the constitutional points raised in the plea proffered by the accused in this matter.

75. Simplistically, as we have all been taught, arteries carry oxygenated blood away from the heart to the rest of the body and veins carry deoxygenated blood back to the heart<sup>50</sup>. Between the heart and the lungs lies another circuit – the pulmonary circulation - where oxygenation takes place and which completes the loop of that circuit between the lungs and the heart, feeding into the systemic circulation via the

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<sup>46</sup> Reg 332A.

<sup>47</sup> 2.3 of the Guidelines.

<sup>48</sup> Dräger instruction manual, Page 18.

<sup>49</sup> 2.4 of the Guidelines.

<sup>50</sup> There are two exceptions within the pulmonary circuit: the pulmonary artery which conveys deoxygenated blood and the pulmonary vein which conversely carries oxygenated blood.



heart. The carotid artery supplies oxygenated blood and nutrients to the brain and the jugular vein carries deoxygenated blood and metabolic by-products away from it.

76. The kind of alcohol recreationally consumed is more specifically named ethyl alcohol or ethanol. It is the presence of this type of alcohol in a consumer's blood which is a particular concern since its presence therein has the potential to impair driving ability because it is conveyed to the brain via the bloodstream.

77. A human brain consists of three major parts - the cerebrum, cerebellum and medulla – all are perfused by cerebral circulation, which is in turn supplied by the body's systemic circulation. The cerebrum controls the advanced functions, such as reasoning, vision, recognition and emotion, as well as movement, reflexes, balance and co-ordination. When one consumes alcohol it lowers inhibitions and affects one's judgment, movement, vision and speech. The medulla controls basic survival functions such as heartbeat and breathing, both of which processes can be stopped entirely by excessive alcohol consumption<sup>51</sup>.

78. Nerves in turn carry messages to different parts of your body with instructions to do things. The brain and the nerves are made up of neurons which in turn carry the messages from your brain and back. The neurons do not actually touch one another – there are spaces between them called synapses. Electrical signals carry messages the length of the neuron and neurotransmitters carry the messages across the synapse to the next neuron. It is in the synapses that alcohol affects the

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<sup>51</sup> W E Cooper et al *Alcohol, Drugs and Road Traffic* (1979) 149 and following.

working of your brain, as a couple of drinks will affect the efficiency with which neurotransmitters carry messages between the neurons<sup>52</sup>.

79. Despite the fact that a drink or two cheers up most people, alcohol is actually a nervous system depressant – the more you drink, the more difficult it is for your brain to function properly. This is why someone who has had too much to drink has difficulty in walking a straight line, or speaks in a slurred fashion, drives in a weaving pattern across the road and is slow to brake in an emergency situation.

80. Driving requires the simultaneous and rapid use of various basic skills ranging from perception and judgement through decision-making and finally to physical reaction. When a driver has had too much to drink that driver's ability to effectively co-ordinate these processes is negatively impacted.

81. Therefore it has been generally accepted that a drunk driver may typically be observed to, *inter alia*, have: a limited ability to judge distances – between both stationary and moving objects; difficulty in maintaining a constant speed - and therefore a steady following distance; difficulty in maintaining a direct path of travel – frequently deviating from it and then compensating therefor; a reduced ability adequately to observe surroundings – which would include traffic signs and signals, other vehicles as well as pedestrians; as well as an increased inability to react timeously and take corrective or evasive action – which is, ultimately, the cause of accidents.

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<sup>52</sup> *Ibid*

82. Before the advent of routine blood testing, the level of impairment of a driver due to alcohol consumption used to be gauged at the scene by officers trained to determine such. Inevitably, drivers deemed sufficiently impaired to be criminally prosecuted would challenge this observation in various ways. An obvious basis would be that the impairment may have been caused by something other than a quantity of ethanol sufficient to cause such impairment.
83. When the only tests done were physical examinations, they were usually performed by a medical practitioner. The ultimate purpose thereof was to gauge a person's level of impairment and this was done by, *inter alia*, assessing: the general appearance of the object, including the eyes; respiration, pulse and temperature; the presence of a smell of alcohol; behaviour – including co-ordination reflex action and level of alertness.
84. The clinical evaluation would be reduced to a report on the basis of which the examiner could later testify. In spite of the lengthy procedure, it was not deemed to be sufficiently reliable and not a real measure of the quantity of alcohol a person had consumed. So, when blood sampling became a viable option, the enquiry was simplified to the question of whether or not a person's blood alcohol concentration exceeded the legal limit.<sup>53</sup>

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<sup>53</sup> W E Cooper, T G Schwar, L G Smith *Alcohol, Drugs and Road Traffic* (1979) 155-7. An issue in regard to the admissibility of an Exhibit marked K arose during this trial. Since it was not necessary for the court to rely on the contents thereof, there is no need for me to make a finding in this regard.

85. When it became possible to scientifically determine the quantity of ethanol in an impaired driver's blood, that development became the logical progression in order to avoid the subjective element inevitably present when officers were tasked to gauge a person's level of impairment caused by ethanol. Blood samples would be taken and the level of ethanol in the driver's blood would actually be measured as a scientifically based indication of the impairment feared.
86. As time went by, science, equipment, and the understanding of the relationship between ethanol consumption and ethanol impairment all developed to the point we know it today. We know, for instance, that some persons may develop a tolerance towards high consumption of ethanol which others do not have. This will result in a situation where the highly tolerant person and the not so tolerant person may both produce an identical test result but the latter will exhibit a greater degree of impairment.
87. It also became clear that the rate at which alcohol is absorbed and eliminated may differ. While elimination begins as soon as someone begins to drink, if the person continues drinking beyond that person's ability to metabolise<sup>54</sup> the alcohol, the concentration found in the blood will continue to rise. This is generally referred to as the 'absorptive phase'. Thereafter, when absorption stops, there will be a period – referred to as a 'plateau' – before elimination, and thus a decline, begins. That is generally referred to as the 'post-absorptive phase'. Evidence was presented, aided by means of graphs, to demonstrate a so-called 'absorptive curve'.

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<sup>54</sup> Once the driver's liver can no longer adequately process the volume of alcohol ingested.

88. Clearly, it is not possible to individualise each test to each driver tested to the point that there can never be any question of a lack of fairness to any one individual. Therefore a balance needs to be sought between the scourge which is sought to be eradicated and the rights of each individual driver with an ethanol reading in either blood or breath in excess of the legislated amount. The legislature has an obligation to introduce measures to protect society from the effects described above.

89. Drinking and driving in South Africa has for many decades been a problem that needed to be addressed. In 1913 the Transvaal, as it was then, enacted legislation addressing this problem and in this province in 1926 the Cape Motor Car Ordinance 12 of 1926 stated that it was an offence for a person to be in charge of and to drive a motor car on a public road while under the influence of *intoxicating liquor*<sup>55</sup> (*my emphasis*). This ordinance was later repealed in 1938 by the Motor Vehicle Ordinance 15 of 1938, which stated it was an offence for a person to drive a motor vehicle on a public road while being under the influence of *intoxicating liquor or narcotic drugs*<sup>56</sup> (*my emphasis*).

90. By the end of 1938 it was an offence for a person to drive a motor vehicle on a public road while being under the influence of intoxicating liquor or narcotic drugs in the Transvaal, Cape, Orange Free State and Natal. During 1955 and 1957 attempts were made to consolidate the various ordinances however, Transvaal still had their own ordinance. In 1966 a further attempt was made for the uniformity of the

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<sup>55</sup> W E Cooper et al, *Alcohol Drugs and Road Traffic* (1979), chapter 1, introduction page 1.

<sup>56</sup> W E Cooper et al, *Alcohol Drugs and Road Traffic* (1979), (Ordinance 15 of 1938, Section 48 (1)(b)).

ordinances with success, the Road Traffic Ordinance 21 of 1966 came into operation on 1 January 1967 and for the first time introduced an offence that related to blood alcohol concentration.

91. Section 140 of the ordinance dealt with driving under the influence. It stated:

1. *"Any person who on a public road –*  
  - (a) Drives a vehicle; or*
  - (b) Occupies the driver's seat of a motor vehicle, the engine whereof is running,*  
*While under the influence of intoxicating liquor or a drug having a narcotic effect, shall be guilty of an offence....*
2. *Any person who on a public road-*  
  - (a) Drives a vehicle; or*
  - (b) Occupies the driver's seat of a motor vehicle, the engine whereof is running,*  
*While the percentage of alcohol in his blood expressed in grams per one hundred millilitres of blood is not less than 0.15 per cent, shall be guilty of an offence...."*

92. Over the years the legal limit of 0.15 gram per 100 millilitres was reduced to 0.05 gram per 100 millilitres of blood. This calculation is based on an adult male, weighing approximately 68 kg and who has eaten a meal before or during the consumption of alcohol. Women, we have learned, metabolize alcohol faster and will reach their limit faster; but each individual is unique and is affected by alcohol differently<sup>57</sup>.

93. In respect of a contravention of section 140 (2)-(3) of the Ordinance the law had developed certain safeguards, either through legislative means or through the

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<sup>57</sup> Arrive Alive Website: [www.arrivealive.co.za](http://www.arrivealive.co.za), comments are common cause.

positive law, in order that the taking of and the analysis of a blood sample to produce a result could be relied on. For example the Criminal Procedure Act described the procedures of drawing the blood<sup>58</sup>, the type of container was prescribed, the amount of blood to be taken and the preservation of the sample was important. Precautions as to any form of contamination were also taken<sup>59</sup>.

94. It is common cause that blood sampling is still one of the most accurate forms to measure the blood alcohol concentration. In South Africa the preferred method evolved from blood serum analysis<sup>60</sup>, which involved several steps, to the currently used and simpler 'head space' <sup>61</sup> gas analysis. I note with interest that the latter method depends on a principle named 'Henry's Law' which will be discussed in detail below.

95. The testing of a driver's blood for the purpose of prosecution in terms of s 65 of the RTA seeks to determine the level of ethanol in that driver's blood - or more simply blood alcohol concentration, ("BAC"). While it is the ethanol in the arterial blood supply to the brain which impairs driving ability, for the sake of convenience<sup>62</sup>, blood

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<sup>58</sup> Criminal Procedure Act 51 of 1977 section 37(c) states: "*take such steps as he may deem necessary in order to ascertain whether the body of any person referred to in paragraph (a) (i) or (ii) has any mark, characteristic or distinguishing feature or shows any condition or appearance: Provided that no police official shall take any blood sample of the person concerned nor shall a police official make any examination of the body of the person concerned where that person is a female and the police official concerned is not a female;*"

<sup>59</sup> *S v Nel* 1967 (2) PH H349 (GW); *S v Ngcobo* 1969 (1) SA 249 (N); *S v Pillay* 1969 (2) SA 248 (N); *S v Greef* 1970 (4) SA 704 (O); *S v Cook* 1972 (2) PH H(S) 63 (N); *S v Van Zyl* 1972 (2) PH H(s) 102 (NC); *S v Marx* 1972 (3) SA 61 (E); *S v Kessel* 1975 (1) PH H27 (C); *S v Brumpton* 1976 (3) SA 236 (T); *S v Glegg* 1973 (1) SA 34 (AD); *S v Francis* 1977 (1) SA 643 (AD); *S v Rossouw* 1971 (2) SA 99 (C).

<sup>60</sup> Whole blood is first separated into solids and serum. The serum is then analysed for alcohol content and the concentration of alcohol in the whole blood is then calculated by means of a formula.

<sup>61</sup> By means of automated gas-liquid chromatography.

<sup>62</sup> It is much less invasive and therefore the level of skill required to draw the sample is lower.

alcohol testing is routinely carried out by means of a sample taken from a vein at the elbow rather than an artery at the neck of a person. Therefore the reading obtained will be venous blood alcohol concentration, ("VBAC"), rather than arterial blood concentration, ("ABAC").

96. This difference between ABAC and VBAC<sup>63</sup> is significant because of the 'absorptive curve' referred to above. While the alcohol in the body is being absorbed any ABAC sample will be higher than a VBAC sample. The converse will apply during the elimination phase<sup>64</sup>.

97. Evidence was presented that Shadow Centre was designed and set up for the purpose of breath alcohol testing. The reason given, in the main, was that the forensic laboratories tasked with blood alcohol analysis were not in a position to render results timeously<sup>65</sup>. Accordingly, a decision was made to provide sites where the alternative method of alcohol testing, namely by breath sampling, can be conducted.<sup>66</sup> This unfortunate and unacceptable failure frustrates the effective prosecution of offences dependent on blood testing.

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<sup>63</sup> Termed 'arterio-venous lag'.

<sup>64</sup> In terms of section 65(5) the presumption is "...any specimen of breath of the person concerned was not less than 0,24 milligrams per 1 000 millilitres of breath taken at any time within two hours after the alleged contravention, it shall be presumed, in the absence of evidence to the contrary, that such concentration was not less than 0,24 milligrams per 1 000 millilitres at the time of the alleged contravention..." This presumption is applicable to the accused and the presumption will succeed on the basis that the specimen of breath was taken at the Shadow Center was indeed taken within two hours of the alleged offence.

<sup>65</sup> The Cape Argus - 29 August 2011: In South Africa there is a backlog of toxicology reports. Media reports suggest that the Health Department takes several months before one could obtain the results of the toxicology reports. This has become a problem in the prosecution of individuals who have cases pending against them for driving under the influence.

<sup>66</sup> There is also an on-site facility for blood sampling, in the event that such be required.



98. It is for this reason that the breath testing is used and relied upon - it is a far less time consuming, economically more advantageous as well as preventing all the potential negative impacts of working with blood. When a breath test is done, one does not have to wait for months for the results since the results are printed by the Alcotest immediately after the breath sample is taken and this would lead to the realisation of speedy and effective justice. As I have indicated above however, it remains clear that any method used must comply with the rule of law.

99. Instruments designed to test breath alcohol, ("BrAC"), were developed since the 1950s as a less invasive and more convenient way of measuring a person's BAC and were predicated on the applicability of 'Henry's Law'<sup>67</sup> - a law of physical chemistry which has been generally accepted to apply to a wide range of dilute solutions.

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<sup>67</sup> Cooper et al, *Alcohol Drugs and Road Traffic* 1979, chapter 25 Breath Alcohol, page 268, as follows:

*'In 1910 Cushny reported on the pulmonary excretion of acetone, chloroform, alcohol and other substances by animals receiving various-sized doses of these compounds and concluded: 'The exhalation of volatile substances from the lungs is exactly analogous to their evaporation from solution in water and the pulmonary cells seem to be purely passive in this process'*

*Widmark in 1920 and Briggs & Shaffer in 1921 reported quantitative studies with animals which indicated that the distribution of acetone between blood and alveolar air obeys Henry's Law. Shaffer & Ronzoni in 1923 and Haggard in 1924 showed that the behaviour of ether in the lungs also obeys Henry's Law. Liljestrand & Linde in 1930 and Haggard & Greenberg in 1934 established that the same principle applies to alcohol in the body. Initially two methods for the determination of alveolar air alcohol content were developed, the one employing total expired air, the other alveolar air.*

*Bogen in 1927 described a breath alcohol method employing total exhaled air and was the first to propose breath alcohol analysis for medico-legal purposes. The use of alveolar air was reported by Liljestrand & Linde in 1930. A special apparatus, the Alcometer, was developed by Greenberg & Keator to examine such samples. A third breath method using the alcohol-carbon dioxide ratio in expired air was reported by Harger in 1931. The portable apparatus developed later was named the Drunkometer. Moore & Forrester in 1941 published details of their apparatus which also employed the alcohol-carbon dioxide ration. They named their apparatus the Intoximeter.'*

100. It is undeniable that Henry's Law demonstrably applies in a closed vessel such as a capped test tube. There, at a given temperature and pressure<sup>68</sup>, an equilibrium will form between an amount of gas dissolved in a liquid and the amount of that gas in contact with that liquid's surface. In other words the amount of molecules of that gas in the liquid and above the liquid will become directly proportional over time.
101. The type of gas sought to be measured for the purposes of both evidential blood testing<sup>69</sup> as well as evidential breath testing is ethanol and the liquid is blood. According to Henry's Law, applied as outlined above, the same amount of ethanol will be found in the blood as in the air above the blood, once equilibrium has been reached.
102. It had been accepted since the 1930s that the principle applicable in Henry's Law as demonstrated in a laboratory could be replicated in the human respiratory tract. Deep lung, more specifically alveolar, air had been accepted to be the repository for the quantity of ethanol sought to be measured since the alveoli are directly perfused by ethanol-containing capillary blood. The ethanol concentration in the blood supplying the lungs would then be reflected in the air expelled from the lungs once a balance between the two had been achieved.
103. ABAC, it was accepted, was precisely related to the concentration of alcohol in alveolar air, ("aBrAC"), once the two had equilibrated. The aBrAC would therefore

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<sup>68</sup> The calibration formula used by NMISA is @ 34°C + 101.325 kPa.

<sup>69</sup> Either by means of gas-liquid chromatography ("*head-space gas measurement*") as generally used in South Africa, or the 'gold standard' of gas chromatography – mass spectrometry ("GC-MS").

be directly reflective of ABAC and thus a virtually direct method of determining the potential impairment of a consumer's driving ability. The Alcotest is premised on the principle of Henry's Law in that it was designed to measure samples of alveolar air.

104. More recently, there has been a challenge to the applicability of Henry's Law in evidential breath testing. A shift has been proposed<sup>70</sup> away from that principle towards a 'new paradigm' which is predicated on the following principle: the respiratory tract does not behave like a closed test tube and Henry's Law can therefore not demonstrably apply.

105. This 'new paradigm' states that the airways between the alveoli and the mouth of an individual are not 'anatomic dead space' such that they do not interact with the air which travels from the outside environment to the alveoli and back again.

106. The bronchial airway, according to this 'new paradigm'<sup>71</sup>, interacts with the passing air both on inspiration and expiration and thus has an effect on the ethanol gas sought to be measured. Accordingly, when one breathes in, the mucosa of the bronchi heat and humidify the inhaled air and in that process release some highly soluble ethanol gas into that air on its way into the alveoli. Then, when one breathes out, the process is reversed and in cooling and dehumidifying the exhaled air, some of the ethanol gas is deposited onto the mucosa of the bronchi. This, it is

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<sup>70</sup> Michael P. Hlastala, PhD - *vide* Journal of Forensic Sciences March 2010, volume 55, number 2, page 451. Toxicology paper titled "Paradigm Shift for the Alcohol Breath Test".

<sup>71</sup> James G. Wigmore, BS – *vide* Journal of Forensic Sciences January 2011, volume 56, number 1, page 266 – comments on the Hlastala paper and points out that the term "*should probably be more accurately described as a model refinement ... [since] the interaction of breath alcohol with the mucosal surfaces of the respiratory passages has been known since at least 1964.*"

suggested, would then mean that it would not be possible to measure unaltered alveolar air at the mouth.

107. In the common understanding of the forensic community it had been accepted that the graphically represented flat section at the end of a graphically represented complete sample of breath taken with a breath testing instrument is an 'alveolar plateau'<sup>72</sup>. This 'new paradigm' challenges that understanding. In other words, it states instead that the alveolar plateau is not necessarily that, but simply a plateau reached when a person ceases exhaling and may not be indicative of alveolar air at all.

108. It is not clear how the principles proposed by this paradigm shift can be conclusively measured against the principles of the accepted old paradigm if it is not in fact possible – as the 'new paradigm' itself appears to state - to sample alveolar air. This 'new paradigm' indicates that what is in fact tested is essentially bronchial air<sup>73</sup>. This would then mean that the reading given by a machine testing a person's breath would actually not be measuring aBrAC but bronchial BrAC ("*bBrAC*").

109. Ultimately, the question posed is whether an instrument, if sufficiently specified as well as correctly programmed and operated, can deliver a result based on which a person may properly be prosecuted given the South African legislative framework and constitutional imperatives. The premise on which a breath testing instrument is

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<sup>72</sup> Hlastala article, page 452 and fn 7 and 8 therein.

<sup>73</sup> "The alcohol that arrives at the mouth comes essentially from the airways and not from the alveoli." Hlastala article, page 453.

based may not be unassailable in scientific terms, but the question I have to consider is whether the Alcotest can deliver a result based on which a person may properly be prosecuted - irrespective of whether it was built on the basis of the old paradigm and not the new one.

110. The defence's position was that the Alcotest, admittedly predicated on the old paradigm of measurement of aBrAC, was therefore not capable of producing a result reflective of BAC, whether it be ABAC or VBAC. The State obviously espoused a contrary view.

111. In considering the evidence presented in respect to the "old paradigm" and the proposed 'shift' to the "new paradigm", I have to consider what result the Alcotest in question delivers. In other words, does it make a material difference to the result whether the air measured actually originates from the alveoli or the bronchi and the resultant BrAC represents aBrAC or bBrAC?

112. In order to answer that question I shall turn to the evidence before me which I accept. The most tangible are the various diagrams and graphs which seek to demonstrate the principles involved.

113. The lungs are perfused by the pulmonary circulation loop, and deoxygenated blood becomes oxygenated blood when the gaseous exchange between carbon dioxide takes place in the alveoli. This is why it has been accepted that there would be an equivalent gaseous exchange between BAC and BrAC. The airways,

including the bronchi are perfused by the body's main, or systemic, circulatory system and it was accepted that no gaseous exchange therefore took place outside the alveoli.

114. As discussed above, ABAC is more indicative of potential impairment than is VBAC because the most recently oxygenated blood from the lungs supplies the brain via the carotid artery. In contrast, the blood sample which renders VBAC is taken on the return journey towards the lungs at a superficial vein<sup>74</sup> at the elbow – some distance from the brain. There have been sufficient graphs shown illustrating the difference between the two that there can be no doubt in that respect.

115. Since the airways, including the bronchi and connective tissues of the lungs, are perfused by arterial blood of the systemic circulation they are in fact perfused by the same type of blood which is part of the same circuit as the one which supplies the brain.<sup>75</sup>

116. The main proponent of the 'new paradigm' in fact accepts that "strong correlation between BrAC and arterial alcohol concentration"<sup>76</sup> was demonstrated by a study published in 2007<sup>77</sup>. He also accepts that as being "consistent with the new

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<sup>74</sup> The three peripheral veins usually used, in order of preference are: median cubital, cephalic and basilic.

<sup>75</sup> Expert testimony of Dr. P Berman R 601:14-16.

<sup>76</sup> *Id.*

<sup>77</sup> Hlastala artice, footnote 52.

paradigm in that exhaled breath alcohol is closely related to the alcohol originating from the bronchial (systemic arterial) circulation perfusing the pulmonary airways<sup>78</sup>.

117. This 2007 study<sup>79</sup> was performed on a type of machine which allows 'free exhalation' in other words exhalation not using a tube. It sought to analyse whether this type of equipment could render an accurate result of BrAC in relation to ABAC. VBAC was tested for comparative purposes since it "serves as a standard in forensic practice for the prosecution of drunk drivers and as a measure of their impairment and drunkenness"<sup>80</sup>. For the purposes of the study, it was accepted that "breath alcohol ... depends on the equilibration of alcohol ... between the pulmonary capillary blood and the alveolar air"<sup>81</sup> and that what was sought to be measured was aBrAc. No comparison was made in that study between the results measured with this equipment and equipment which uses a tube.

118. Neither its main proponent, nor the 'new paradigm' itself, concludes that it is not possible to accurately measure a type of BrAC which is accurately reflective of ABAC<sup>82</sup>. The 2007 study, quoted with approval, in fact makes it clear that the equipment therein tested "predicts almost precisely the arterial blood

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<sup>78</sup> Hlastala article, page 454.

<sup>79</sup> Lindbergh, L *et al*, paper: "Breath alcohol concentration determined with a new analyser using free exhalation predicts almost precisely the arterial blood alcohol concentration" in *Forensic Science International* 2007; 168:200-7.

<sup>80</sup> Lidbergh article, page 201.

<sup>81</sup> *Id.*

<sup>82</sup> He also accepts, in a reply to criticism of his paper cited above, that BrAC remains closely related to ABAC during both the absorptive and the elimination phase. *Journal of Forensic Sciences* November 2010, volume 55, number 1, page 1665.

concentration”<sup>83</sup>. This study also comments that it is not “a fair comparison”<sup>84</sup> to compare the accuracy of machines which were examined in separate trials against each other. The paper on the proposed paradigm in fact concludes with suggestions in order to improve the accuracy of existing equipment – which uses a tube – and lists variable factors which need to be adequately controlled so as to render a fair test result.

119. Having found that there is a strong correlation between the two, subject to the safeguards expressed in *State v Chun*<sup>85</sup> (“*Chun*”), even if there is merit in the new paradigm, it would not make a substantial difference which would lead to the irrational application of the test.

120. It has further not been demonstrated that any application of section 65(3) or (5) that a conviction or acquittal may depend solely upon the choice between blood or breath testing. It has been historically accepted that the contravention of blood alcohol concentrations above a certain limit is rational. As I have shown above, a direct correlation between arterial blood and breath alcohol has been scientifically established. This correlation is sufficiently related so that similar inferences which are drawn from blood alcohol could be drawn from breath alcohol - subject to necessary safeguards prescribed in terms of the Regulations and further

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<sup>83</sup> Lindbergh paper, title.

<sup>84</sup> Lindbergh paper, page 206.

<sup>85</sup> *State v Chun* 943 A.2d 114 (N.J.2008).



suggestions which have been implemented in other jurisdictions in order to deliver an “acceptable” result<sup>86</sup>.

121. Whilst it is accepted that breath and blood alcohol limits can differ from individual to individual, it is possible to overcome any potential prejudice by having regard to the particular characteristics of the particular subject so as to compensate for that.

122. In the case of *Merafong Demarcation Forum And Others v President Of The Republic Of South Africa And Others*<sup>87</sup> the following was state:

*“The exercise of public power has to be rational. In a constitutional State arbitrariness or the exercise of public power on the basis of naked preferences cannot pass muster. Judgments of this court suggest that, objectively viewed, a link is required between the means adopted by the legislature and the end sought to be achieved. The fact that rationality is an important requirement for the exercise of power in a constitutional State does not mean that a court may take over the function of government to formulate and implement policy. If more ways than one are available to deal with a problem or achieve an objective through legislation, any preference which a court has is immaterial. There must merely be a rationally objective basis justifying the conduct of the legislature. Provided a legitimate public purpose is served, the political merits or demerits of disputed legislation are of no concern to a court. In *Pharmaceutical Manufacturers Chaskalson P* made it clear that the rationality standard does not mean that courts can or should substitute their opinions for the opinions of those in whom the power has been vested. A court cannot interfere with a decision simply because it disagrees with it or considers that the power was exercised*

<sup>86</sup> *R v Powichrowski* 2009 ONCJ 490; *R v Duff* [2011] 3 W.W.R.703.

<sup>87</sup> *Merafong Demarcation Forum And Others v President Of The Republic Of South Africa And Others* 2008 (5) SA 171 (CC) at 192 para 62-64; see also: *United Democratic Movement v President of the Republic of South Africa and Others (African Christian Democratic Party and Others Intervening; Institute for Democracy in South Africa and Another as Amici Curiae)* (No 2)2003 (1) SA 495 (CC) (2002 (11) BCLR 1213; [2002] ZACC 21) at para 68 (UDM 2); *Bel Porto School Governing Body and Others v Premier, Western Cape, and Another*2002 (3) SA 265 (CC) (2002 (9) BCLR 891; [2002] ZACC 2) at para 45; *Pharmaceutical Manufacturers Association of SA and Another: In re Ex parte President of the Republic of South Africa and Others*2000 (2) SA 674 (CC) (2000 (3) BCLR 241; [2000] ZACC 1) at para 85 (*Pharmaceutical Manufacturers*); *Prinsloo v Van der Linde and Another*1997 (3) SA 1012 (CC) (1997 (6) BCLR 759; [1997] ZACC 5) at para 36.

*inappropriately. The question of the rationality of the Twelfth Amendment was left undecided in Matatiele 2. In UDM 2 it was held that rationality is a minimum requirement for the exercise of public power and that the Pharmaceutical Manufacturers qualification 'applies also and possibly with greater force to the exercise by Parliament of the powers vested in it by the Constitution, including the power to amend the Constitution'. In view of the finding below on rationality in the light of the facts of this case, it is not necessary to take this specific point any further. The respondents argue that it is eminently rational to do away with cross-boundary municipalities. The applicants agree with the idea of abolishing cross-boundary municipalities and do not attack the rationality of the Twelfth Amendment as a whole, but only the part of it that locates Merafong in North West. Furthermore, the fact that it is rational for the whole municipality to be located in a single province does not necessarily mean that the province should be in North West, rather than Gauteng, counsel for the applicants specifically contended”.*

123. I find that there is no merit in the constitutional challenge to section 65 (5) as pleaded by the accused. Consequently I am not in agreement with the defence stating:

*“2.4 that section 65(5),(6) and (7) of Act 93 of 1996 conform to the requirements of the rule of law and the Constitution of the Republic of South Africa, namely the legislation rationally serves a legitimate purpose of government without vagueness, arbitrariness or capriciousness, in that:*

- 2.4.1 breath alcohol has no scientifically established direct correlation with a person’s motor or perceptual skills and the ability of that person to drive a motor vehicle;*
- 2.4.2 the correlation between breath alcohol and blood alcohol levels differs from individual to individual and therefore a conviction or acquittal may depend solely upon the type of test used and is therefore arbitrary and unreasonable.”*

**The Dräger Alcotest 7110 MK 111 as used in this case**

124. It is unclear from the evidence presented whether Alcotests used in other provinces are of the same type and model as the one used in this case. Likewise, it is not clear whether, *inter alia*, calibration and maintenance of those other Alcotests take place in the same way as discussed here. I will therefore not comment on the reliability thereof, but I am of the firm view nonetheless that all are required to comply with the legislative framework as set out above.

125. While evidence was presented in this trial that the type of machine in question is capable of very many things, it also became apparent that the model used to test the accused was not ordered with all the possible devices which are available<sup>88</sup>, nor was its operating system as comprehensive as it might have been<sup>89</sup>.

126. The Alcotest used in this case, as appears reflected on the printout it delivered<sup>90</sup> - and will appear from the comparative analysis I will discuss below, is minimally equipped: the "SUBJECT MEASUREMENT" segment reflects "FAILED BLOWING 0"; there is a time shown at which the test took place; that is followed by a sequence - "BLANK", "MEASURE VALUE", "BLANK" - the import of which will become clear shortly; followed by "RESULT" given as a figure followed by "mg/l".

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<sup>88</sup> The hardware or components of the machine (and accessories).

<sup>89</sup> The software or programming which runs the machine (and accessories).

<sup>90</sup> Pasted into one of two designated spaces of a document handed up as Exhibit F. I note that the second space has been left empty.

127. Evidence as to the workings of the Alcotest was presented by a Dräger expert<sup>91</sup> from which I understand the following basics: there needs to be one ‘successful’ breath sample taken on which the machine will perform two tests. The first test directly tests the breath sample and the second concurrently tests the accuracy of the first test as well as checking for the presence of any ‘interfering substances’. If all is ‘within tolerance’, a test report will be printed on which the result of the first test will be displayed - with such additional information as has been programmed to appear thereon. All functions of the Alcotest - sequence of events, procedures to be followed, analysis performed, result produced - are controlled by unseen software which gives visual, and sometimes audible, prompts to the operator.

128. It also became apparent that the operating sequences and instruction manual referred to in sections 6.12 and 8.1.2 respectively of R 126 above are - in the form in which they exist here - not as comprehensive or as clear as it is possible for them to be. Simply put, the instruction manual and operating sequences does not conform to the prescribed detail as to be found in OIML R 126. It is on this manual that training of the operators is based that ultimately leads to a result upon which prosecuting authorities want courts to rely.

129. Further, the manual titled “Dräger Alcotest 7110 Instructions for Use”<sup>92</sup> appear confusing in that the second page interposes the additional designation “MK 111 RSA” while the later content variously refers to “the legal system of the Federal

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<sup>91</sup> Dr. J Sohège

<sup>92</sup> Part of defence Exhibit B, pages 6 – 31 thereof.

Republic of Germany”<sup>93</sup>, a location of “Police Station Kapstadt”<sup>94</sup> and a time period between inspections in accordance with a framework document of “Great Britain”<sup>95</sup>.

130. The last page of this manual designates a part number – 83 14 647 – to a model termed “Alcotest 7110 MK III RSA, complete”, but then goes on to list numbers for “[s]pare and wearing parts” ranging from paper for the printer to a “Dräger-Keyboard”.<sup>96</sup> It would appear that the printer is “integrated” while the keyboard is an “[o]ption” which allows for the entry of “[a]dditional data for the record”.<sup>97</sup>

131. The “Functional description”<sup>98</sup> of the Alcotest reads as follows:

*“The ALCOTEST 7110 analyses the alcohol content of the air exhaled by the person being tested. The alcohol measuring system analyses the alcohol concentration in a measuring cell with the assistance of the infrared absorption (IR). The attenuation of infrared radiation by the breathing air sample gives an indication of the amount of alcohol contained in the sample.”*<sup>99</sup>

*Additionally, to detect the presence of interfering substances and to control the IR-system, a second analytical system (using an electrochemical fuel cell) is integrated in the instrument.”*<sup>100</sup>

*The instrument adapts to the respiratory physiology of the person being tested. It monitors the exhalation procedure and measures the exhalation volume.”*<sup>101</sup>

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<sup>93</sup> Page 3 of the manual.

<sup>94</sup> Page 8 thereof.

<sup>95</sup> Page 18.

<sup>96</sup> Page 24.

<sup>97</sup> Page 5.

<sup>98</sup> Page 5.

<sup>99</sup> Infrared spectroscopy is the measurement of electromagnetic radiation wavelength of the infrared spectrum. This is done in a test chamber designed for the purpose called a ‘cuvette’.

<sup>100</sup> Electrochemical technology measures the curve of electrically induced chemical oxidation of a substance. This takes place in a test chamber designed for that purpose called a cell.

<sup>101</sup> By means of sensors programmed to monitor the existence – or absence - of given parameters.

132. The “accredited test laboratory” used for the purposes of calibration of the infrared cuvette, (“IRC”), of the Alcotest, as required both in terms of Reg 332A as well in terms of the Guidelines, was NMISA. Evidence was however led that NMISA does not attend to the calibration of the electrochemical cell, (“ECC”), because it is not equipped to use the recommended ‘wet bath’ method.<sup>102</sup> Accordingly, Dräger Service SA itself adjusts the ECC once the IRC has been calibrated by NMISA using dry gas.<sup>103</sup>

133. No evidence was led that Dräger is an accredited laboratory, and no calibration certificate was proffered in respect of calibration of the ECC. The chain of custody of the Alcotest was explained as follows: the Alcotest is delivered to Dräger by the traffic authorities whereafter Dräger will first conduct servicing thereof - documentation presented however showed that an ‘adjustment’ is made at the same time - the Alcotest is then presented to NMISA and the calibration as discussed above is performed by NMISA, Dräger then receives the Alcotest from NMISA and adjusts the ECC to comply with the parameters set by the calibrated IRC before it is returned to the traffic authorities. This process is never independently verified.

134. The reader is instructed to “[p]lace the instrument in a “Gas Simulator Unit” before plugging in, switching on the unit and pressing the start button “[t]o attain the ‘measuring’ position”.<sup>104</sup> As previously discussed, the Alcotest is calibrated and so

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<sup>103</sup> Dr. A Botha

<sup>104</sup> Page 6.

'verified' by NMISA using a dry gas cylinder. No evidence was presented that any 'gas simulator unit' is routinely used other than in a laboratory environment.

135. A section titled "Preconditions for the person being tested"<sup>105</sup> is interposed at that point, which lists essentially four issues of principle:

1. That a 15 minute waiting period is necessary between the last intake of any alcohol-containing substance so as to avoid a "impermissibly biased measurement". That the same waiting period is to be observed after "vomiting or belching", for the same reason.
2. That a 5 minute waiting period is necessary after smoking in order to prevent possible damage to the unit's sensors.
3. That "the person being tested should breathe normally and evenly, and not breathing in or out deeply several times (hyperventilation)".
4. That the "[a]mbient conditions for measurement" need to be in place, which include an absence of alcoholic vapours in the ambient air – as tested by the environment check function of the unit - as well as "excessive tobacco smoke". No evidential measurements must be performed in environments where there is any alcoholic vapour present.

136. Step-by-step instructions follow – both for operation without a keyboard<sup>106</sup> as well as operation with a keyboard<sup>107</sup>. The keyboard entry function allows for input of data which not only personalises the printout with the person's name but also provides other necessary information.

137. The unit is equipped with a display panel as well as an audible alarm with which it communicates its state to the operator. For instance, at start-up, it will display the

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<sup>105</sup> Page 7.

<sup>106</sup> Page 9.

<sup>107</sup> Page 11.

message "AUTOTEST", followed by "OK" and "1 x BEEP" to indicate that it is ready to proceed to the next phase and so forth.<sup>108</sup>

138. There is a warm-up phase because "[i]n order to avoid condensation all parts in contact with breathing air are heated up." A warning follows: "[b]lowing into the instrument during warm-up is not allowed" and the "READY" state is signalled by "2 x BEEP".<sup>109</sup>

139. The section numbered 7, is titled "Performance of measurement" and is divided into six subsections, the first of which is the "[s]tart of measurement (without keyboard)"<sup>110</sup> and explanatory text which states that each procedure begins automatically with the flushing of the system – evidence was led that this is done by my means of ambient air in spite of the wording which reads "[t]he gas passed through the instrument"<sup>111</sup> - accompanied by the sound of the pump and a message "PURGING".

140. The machine performs an "ENVIRONMENT CHECK" by analysing that freshly pumped air in its previously mentioned ECC, and "[i]f no alcoholic vapours are detected", it goes on to perform a test of its "calibration" while displaying "BLANK CHECK". This "calibration" test is designed to be performed on the IRC with the aid

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<sup>108</sup> Page 8

<sup>109</sup> Id.

<sup>110</sup> Page 9.

<sup>111</sup> Id.



of dry gas which is fed into the unit from an “attached gas cylinder”. No evidence was led that there was any external device attached to the Alcotest for ‘field testing’.

141. If the machine does not detect any problems in respect of its operation or its environment, the next phase will follow, which in the manual is titled “Breath test” and states that the unit “is now ready for the breath test of the subject”.<sup>112</sup>

142. I note that the sentence continues as follows “**and requests for the first of two breath samples**”<sup>113</sup> while the display reads “PLEASE BLOW”. Evidence was nonetheless led that, in South Africa, only one breath sample is routinely required by the machine and consequently taken by the operator. There are 20 of the “asterisks” in the display which “indicate increasing volume already exhaled”.

143. The instructions continue with the following words: “[i]f the breath sample is accepted **according to the breath sampling requirements**, the instrument gives a ‘stop’ command in the display.”<sup>114</sup> There is a caution regarding interruption of blowing and reblowing after stopping, both of which are “to be avoided!”.<sup>115</sup>

144. Evidence regarding the abovementioned ‘breath sampling requirements’ revealed the following: one interrupted breath is needed; of a minimum volume of

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<sup>112</sup> Id.

<sup>113</sup> My emphasis.

<sup>114</sup> My emphasis.

<sup>115</sup> Page 10.

1,5 litres; delivered at a given pressure and speed – which displays as a progression of 20 “asterisks”; and an absence of error messages.<sup>116</sup>

145. If an “adequate” – presumably in respect of the abovementioned breath sampling requirements programmed into the machine – breath sample is completed, the sequence will end with a message to “REMOVE MOUTHPIECE”<sup>117</sup>.

146. The measuring procedure ends with another automatic “PURGING” sequence, this time described as being performed “again with ambient air” and is completed with another “final internal check” while the display shows “BLANK CHECK”. Presumably, given the explanation related to this display earlier in the manual, it is another test performed by the ECC.

147. As outlined above, the manual states that the actual breath alcohol test is performed by the IRC. This would then have to take place before the next step described is possible – display of the result.

148. The result, according to the manual, is displayed “[i]f breath sample and details of measuring are met during the whole sequence” as “RESULT” followed by “0.00mg/l”. The instructions interpose that “[i]f any requirement was not met, an **adequate** error message is displayed”.<sup>118</sup>

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<sup>116</sup> No expert evidence was lead regarding the software of this Alcotest specifically in regard to the exact parameters which are programmed as ‘breath sampling requirements’.

<sup>117</sup> The mouthpiece is disposable and comes packaged as an individually sealed part.

<sup>118</sup> My emphasis.

149. There are warning messages listed and explanations therefor<sup>119</sup> designed to warn the operator of errors. Those listed in these sections relate to the readiness of the machine - "NOT READY" – and to the breath samples themselves – "ALCOHOL CONCENTRATION NOT STABLE", "MINIMUM VOLUME NOT ACHIEVED", "BLOWING TIME TOO SHORT" and "MOUTH ALCOHOL". A further list titled "Fault – Cause – Remedy (Most important messages)" can be found at section 11, towards the end of the manual.<sup>120</sup>

150. The third subsection details the printing procedure for the result and it is stated that the default setting is for one "measurement record" to be automatically printed, with a second on demand being possible.

151. Thereafter the fourth subsection titled "Start of measurement (with keyboard)" begins with instructions how to connect the keyboard and activate the "keyboard function". Those are followed by these sentences: "By pressing the red button the instrument is ready to receive the requested inputs" and below, in italics, "NB! *With every request for an entry at least one character of information must be entered before the next request will follow. This character may be only one SPACE.*"<sup>121</sup>

152. The operator is then prompted to enter the "personal data of the subject" in the following sequence: surname, name, case number (or 'space' if none), date of birth

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<sup>119</sup> Pages 8, 13 & 14.

<sup>120</sup> Pages 20 & 21.

<sup>121</sup> Page 11.

(in 'dd/mm/yy' format only), gender ('M' or 'F') which is "mandatory", each time followed by 'enter'<sup>122</sup> until the message "INPUT SUBJECT DATA FINISHED" is displayed.

153. This keyboard sequence would precede the previously set out non-keyboard sequence which the operator is at this point referred back to by the following instruction: "by pressing >ENTER< the instrument starts automatically with the measuring procedure which is described in 7.1."<sup>123</sup> This would mean the "PURGING", "ENVIRONMENT CHECK" and so forth.

154. A subsection titled "Incomplete breath samples" follows<sup>124</sup>, the warning messages in which have been mentioned above. Those messages indicate that "the breath sample was not acceptable" and an instruction to, for instance, have the "TEST REPEATED". In such an event, once the mouthpiece is removed after prompting, "the measuring system will be flushed" and "PLEASE BLOW" will be displayed.

155. Alternatively, in the event that "any unacceptable condition" is identified during the measurement, "the sequence will be interrupted", a "corresponding error is displayed" and a "record" indicating the type of error is also printed. One such "unacceptable condition" is given as an example – "MOUTH ALCOHOL", in which

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<sup>122</sup> Or 'ESC' to return to previous for correction'.

<sup>123</sup> Pages 12 -13.

<sup>124</sup> Page 13.

case the test cycle “is aborted”, the message warning of the condition is displayed and a “protocol is printed”.

156. Again, there is reference to the “measuring system” being “flushed” and made ready for measurement. There is also mention that “the test sequence will be interrupted” in case of blowing “without request”.

157. The sixth and last subsection is titled “Interruption of measurement” with which function “QUICK RESET” of the machine is made possible – only “before the breath test” itself. There is the following text : “Remark: While the measuring cycle is going on and while the record is being printed out, this option is not active. These sequences cannot be interrupted.” Again, there is mention of flushing and re-reading.<sup>125</sup>

158. Section 8 provides an “example” of a “measurement record”.<sup>126</sup> The record of the test in question<sup>127</sup> reveals the totality and the sparseness of the testing process as performed in South Africa. It does however support the evidence given that the accused provided an “adequate” and complete breath sample according to the pre-programmed “breath sampling requirements”. I will deal with what is possible for the Alcotest to do - and consequently also its printout to show - in my analysis of *Chun*<sup>128</sup> later in this judgment.

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<sup>125</sup> Page 14.

<sup>126</sup> Page 15.

<sup>127</sup> Exhibit F.

<sup>128</sup> *State v Chun* 943 A.2d 114 (N.J.2008).

159. Thereafter, section 9 outlines additional functionality only available with a keyboard<sup>129</sup> and functionality not available to the “normal operator”<sup>130</sup>. The latter functionality requires a “special ‘ALCOTEST 7110 HARD KEY LOCK SAFETY SYSTEM’”, failure to provide which will cause three related alerts to be displayed, namely: “NO ADMITTANCE”, “FUNCTION NOT POSSIBLE” and “FUNCTION NOT AVAILABLE”.

160. Section 10 consists of several subsections – the first is titled “Servicing” and relates to “inspection” of the machine which “must be performed by Dräger Service” at an interval of “every 6 months”<sup>131</sup>. The other subsections are explanations of the processes of printer paper and printer ribbon replacement, cleaning – there is a caution against the use of alcohol-containing substances and against liquid ingress into the machine – and fuse replacement respectively.

161. The “Fault – Cause – Remedy” list of the “[m]ost important messages” is found in section 11.<sup>132</sup> Evidence was given at the trial that the Alcotest is capable of being programmed to the requirements of the purchaser. Consequently, a complete list of all the possible warning messages would be tailored accordingly. It is not clear what further messages could or would appear on the model used in South Africa.

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<sup>129</sup> Page 16.

<sup>130</sup> Page 17.

<sup>131</sup> Page 18.

<sup>132</sup> Page 20.

162. Two types of message are displayed on the Alcotest. The one kind requires intervention by Dräger Service and is indicated by "ERROR" followed by a number "XXX" indicating the type of error. In such a case, the machine additionally prints out an automatic message listing the type of fault and switches itself off. The other kind can be remedied by a operator and the action to be taken in such cases is listed.

163. A fault display of "BLANK CHECK INCORRECT" refers to the "[z]ero adjustment" being "incorrect" and is to be remedied by ensuring that the "ambient air is clean and free from alcohol and tobacco smoke". As shown above, a "BLANK CHECK" was previously in this manual characterised as a calibration check using a test gas cylinder. It would then follow that this check being incorrect would indicate a fault with the calibration and not with the environment, this "remedy" therefore confuses the issue at this point.

164. The "MOUTH ALCOHOL" fault protocol was set out in detail before, under the heading "Incomplete breath samples", but listed as an "unacceptable condition". Here, the operator is referred back to the previously covered "Preconditions" section.

165. A fault display of “MINIMUM VOLUME NOT ACHIEVED” was likewise previously mentioned. Under “Cause” there is the explanation that “[t]he supplied volume is smaller than the minimum volume required.”<sup>133</sup>
166. The two faults which follow - “BLOWING NOT ALLOWED” and “READINESS TO BLOW EXPIRED” – may be remedied by “[r]epeat measurement”. The one thereafter, “OUT OF MEASURING RANGE”, refers the reader to the “technical data” which follows near the end of the manual.
167. “ALCOHOL CONCENTRATION TOO BIG” is displayed when there is suspicion of mouth alcohol and the reader is referred to that fault. Evidence was lead that any detection of an extraordinary result would depend on the interaction between the IRC and the ECC. Evidence given on behalf of the state showed that the Alcotest delivered false ‘positive’ results for mouth alcohol if the correct waiting protocol was not followed.
168. The last listed fault able to be remedied by the operator is “KEYBOARD-ERROR” which requires a repeat of the desired function, after – “[i]f necessary” disconnecting and reconnecting the keyboard.
169. Section 12 shows a front and a rear view of the machine, both of which have numbered pointers and a list displaying the names of the parts so indicated.<sup>134</sup>

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<sup>133</sup> The minimum volume in South Africa is set at 1.5 litres of breath.

<sup>134</sup> Page 22.



170. There is section titled “Technical Data”<sup>135</sup>, section 13, the first subsection of which lists “[a]mbient conditions” for both “[o]peration” and “[s]torage”. According to the data given, operation should only be performed at temperatures ranging between 0 and 40°C, in relative humidity of 10% to 95% and at an atmospheric pressure of between 600 to 1300hPa. Storage may be at a temperature of between 40 – 70°C.
171. The second subsection is titled “Measurement cycle” and reflects a “[m]easuring range” of 0 to 300 ug/100ml. The ‘typical’ duration of a measuring cycle is given as “4 minutes” and the number of tests “per cycle” is listed as “3”. No detail is provided as to what each of those tests is. There are three “allowed failures (per test)”, but no detail as to the meaning thereof.
172. “Characteristic operation values” follow and list power supply, fuses, type of printer, paper, time display, typical warm-up time at room temperature, approximate dimensions and weight in the last subsection.
173. There is a heading on the final page of the manual at section 14<sup>136</sup> - “Additional Remarks” – related to transportation (avoid shock, etc.) and storage (dry rooms only) of the machine.

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<sup>135</sup> Page 23.

<sup>136</sup> Page 24.

174. Lastly there is an “Order List” – section 15 – which gives part numbers, including the model number 83 14 647, as discussed above.
175. The abovementioned Prosecution Guidelines make mention of certification of an operator of an “EBTM”<sup>137</sup>. Such a certificate of competence is only given to an operator who has successfully completed an operator’s course for the particular make and model of the machine actually used.
176. A document titled “Dräger Alcotest 7110 MK 111 Training” was handed up as an exhibit. It is three pages long and consists, save for three complete sentences, of bullet points. Presumably it is intended as an overview of what is to be presented at the training course and used in conjunction with the manual discussed above.
177. The total time “(for 10 delegates)” is “+/-5 hours” during which the given “[t]raining objectives” of the transfer of “skills and knowledge required to operate the Alcotest 7110 in a competent and professional manner” are transferred to “selected persons”. These persons are then “assessed” by means of a 15 minute theory test – for which a minimum of 18 out of a possible 25 marks must be obtained – and a “practical test” lasting approximately 75 minutes. The practical test consists of five segments, namely “[s]et up”, “[a]ctivate key board”, “[s]elect no. of printouts”, “[c]hange location” and lastly “[t]est a subject”. No further detail is provided and it is not clear what is required for a person to “successfully pass” this aspect of the testing.

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<sup>137</sup> Provision 2.1 thereof.

178. The approximate time break-down for the remainder of the course is given as follows: 30 min for understanding the physiology of alcohol and the body, 10 min for a brief history of the Alcotest - and knowledge of keyboard, 5 min for clarity on intended use, maintenance and calibration, 10 min for familiarisation with the preconditions for the person being tested, 30 min for identification of instrument features, 60 minutes for attaining knowledge to set up the Alcotest 7110, 30 min for knowledge of procedure for testing and 60 min for practice with the instrument prior to testing.

179. The sections of the "Course Content" follow the above order of items and are sequentially marked "A" (physiology of alcohol and the body) – "J" (the tests). "A" includes "Henry's Law" and related concepts which I discuss below. "B" appears to be the history of Dräger itself. "C" to "H" reflect bulleted items which appear in the manual discussed above save for three additional items not found there: the last item under "E" is "[k]now the legal limit" and the last two items of "H" are "[s]ignatures required on protocol to complete test" and "[r]egister and safe keeping of protocols" respectively.

180. We were presented with a *pro forma* document titled : "operator statement" that would require the operator to complete three pages of information after a test was performed, in this case it is clear that no such document was completed.

181. Item "I" is the practical training session which precedes the testing which the operator in this case must have "successfully" passed in order to obtain his

certificate of competence.<sup>138</sup> I note that the training in itself is not sufficient but also the manual appears confusing to the point that it refers to devices and/or parts as well as operations not related to the Alcotest in question.

### **The Dräger Alcotest 7110 MK 111 as used in other jurisdictions<sup>139</sup>**

182. In New Jersey, (“NJ”), no breath-related driving offence exists. Therefore it is necessary to convert any breath alcohol reading to a blood alcohol content for the purposes of prosecution in terms of the statute relating to “driving while intoxicated”.<sup>140</sup>

183. I have heard evidence<sup>141</sup> regarding a mathematical formula used in order to extrapolate a person’s supposed blood alcohol content from a breath sample taken by means of an evidential breath testing instrument – variously the ‘partition/conversion coefficient/factor/ratio’, (“BBR”). I have understood that, while the actual ratio may well be variable – in relation to different persons as well as the same person at different times – the ratio of 2100:1<sup>142</sup> is used in South Africa to draw a relationship between the two offences.

<sup>138</sup> Exhibit C, issued by Dräger dated 18 February 1999. His training took place after the SABS testing but before the final change to the software which runs this Alcotest.

<sup>139</sup> I have not discussed *R v Duff* [2011] 3 W.W.R.73 delivered by the Alberta Court of Canada on 29 September 2010 as it dealt with a different type of Evidential Breath Device. The weight attached to the test report is discussed and relied upon subjects to safeguards.

<sup>140</sup> N.J. STAT. ANN., Section 39:4-50(a). This is true for ordinary drivers. There is however a separate ‘commercial driving’ statute which dictates a maximum alcohol concentration in both blood and breath samples for commercial drivers (39:3-10.11).

<sup>141</sup> T.C. Gilfillan on his CSIR Information Services Study DIS-C209 of November 1996.

<sup>142</sup> (At 34°C,) 2100ml of breath would contain the same amount of ethanol as 1ml of blood (in a person with a body temperature of 37°C and average amount of red blood cells).

184. The evidence presented was based on a study by the expert<sup>143</sup>, which suggested that a BBR of 1900:1 would be preferable to ensure the least possible prejudice for the greatest number of individuals<sup>144</sup>. The BBR used in South Africa was accepted as “a valid measuring mechanism”<sup>145</sup> in NJ and is accepted in various jurisdictions around the world as sufficiently representative.

185. Given that our legislative framework does not require such extrapolation<sup>146</sup> for the prosecution of drivers over a given limit, I shall accept that the chosen ratio is a policy decision and will deal with the related constitutional argument below<sup>147</sup>.

186. Save for the conversion of a breath test result to a blood test result, the remainder of the issues covered in the NJ case of *Chun*<sup>148</sup>, are of particular interest. The machine used there, designated “MK 111 – C”, (“*model C*”), demonstrates a different hardware specification set and operating system to that used in South Africa.

187. While the principles remain the same, the model C machine performs two concurrent tests per sample of breath given – one in the IRC as well as one in the

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<sup>143</sup> Dr. T C Gilfillan.

<sup>144</sup> Evidence was presented which indicated a divergence of opinions between experts as to BBR.

<sup>145</sup> Chun judgment 50 and 51.

<sup>146</sup> It is primarily used in jurisdictions where there is no separately legislated offence of driving with an excessive BrAC. There, a breath sample is taken and a calculation made in order to convert the BrAC into BAC for the purposes of prosecution under the BAC offence legislated in such jurisdictions.

<sup>147</sup> *Rail Commuter Action Group and Others v Transnet Ltd t/a Metrorail and Others* (NO 1) 2003 (5) SA 518 (C) at 575 D; *Beja and Others v Premier of the Western Cape and Others* 2011 JDR 0412 at 68 para 177; *Kolbatschenko v King NO and Another* 2001 (2) SACR 323 (C) at 337 I.

<sup>148</sup> 943 A.2d 114 (N.J. 2008). A copy of the judgement and order as handed down on 17 March 2008 by the Supreme Court of New Jersey (No. A-96, September Term 2006, 58, 879) has been provided to me and I shall use the page references therein rather than those as would appear in the subsequently reported version of the judgement.

ECC. That means that there are two results produced for each breath sample and both the IRC test result and the ECC test results are printed if the results achieved are “within the acceptable tolerance”.<sup>149</sup>

188. The tolerance referred to will be “acceptable” if the four results of two separate samples of breath, taken two minutes apart – with a purging cycle between them – are within a tolerance range of +/- 5% of the mean.<sup>150</sup> In that event, a printout will show each of the readings to three decimal places.<sup>151</sup>

189. In order that a successful test be completed, four breath sample criteria need to be fulfilled. These are only in issue once the machine has performed two checks - first an environment test and then a control test of its two test cells using a wet solution – and a subsequent purging cycle.<sup>152</sup>

190. These breath sample criteria are as follows: there needs to be a minimum volume of 1.5 litres – 1.2 litres in the instance of women over the age of sixty<sup>153</sup>; a minimum blowing time of 4.5 seconds; a minimum flow rate of 2.5 litres per minute; and a plateau must be established by the IRC test measurement in that it must not differ by more than 1% in 0.25 seconds.<sup>154</sup>

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<sup>149</sup> Chun judgement, pages 31, 76, 78 & 97.

<sup>150</sup> Chun order, 2 C. The remaining part of the formula given - “the greater of [the above] or +/- 0.005% BAC from the mean” – is only necessary for the conversion to BAC.

<sup>151</sup> Chun judgement, page 31.

<sup>152</sup> Chun judgement pages 28 & 29.

<sup>153</sup> Chun judgement, page 64, comes to the conclusion that there is no “equal protection violation” in this distinction of either the Constitution of the USA or of the Constitution of the State of New Jersey.

<sup>154</sup> Chun judgement, page 53, order, 2 B.

191. Even then, if two sample results are not within the allowed tolerance referred to above, the machine will request a third sample. There will then be six test results (three each of IRC and ECC tests) and there will be a calculated result based on the four which are within the stated tolerance.<sup>155</sup>
192. The printout then reports a final breath alcohol result which is a calculation of the lowest of four readings obtained.<sup>156</sup> All breath test readings are displayed on the printout - six, if there was a third sample taken because the first two pairs were not within tolerance. There is even a report where there is no reportable result.
193. The Court in addition ordered that the printout be programmed to display, *inter alia*, the currently used software version, control test results - meaning the readings of the tests the machine uses to check itself - prior to the application of the ECC “drift” algorithm<sup>157</sup>, the reason why there is no reportable result, as well as such detail as would be required to check the proper workings of the machine, for instance, calibration documents.<sup>158</sup>
194. The State was ordered to, *inter alia*, produce in discovery twelve “foundational documents” designed to assist the defence.<sup>159</sup> The court also issued an order that the operator of the machine in question be made available to testify and produce

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<sup>155</sup> Chun judgement, pages 31 & 97.

<sup>156</sup> That final result is truncated by omission of the third decimal place. There is ultimately a conversion, using the abovementioned 2100:1 ratio, to blood alcohol for the reasons outlined above. This would be redundant in the South African legislative framework.

<sup>157</sup> Discussion thereof at judgement, page 89. A related discussion of the IRC “weighted average” algorithm follows at judgement, page 95.

<sup>158</sup> Chun order, 2 F – J. See also discussion at judgement, page 42.

<sup>159</sup> Chun order, 3 C.

documents evidencing such operator's training.<sup>160</sup> Further, that three "foundational documents" be offered into evidence "to demonstrate the proper working of the Alcotest".<sup>161</sup>

195. All that being in place<sup>162</sup>, the Justices in *Chun* decided that they were "satisfied that, ...the confrontation rights of defendants have been, and will continue to be, protected." They continued to say that they "have no doubt that the device, with the safeguards ... required, is sufficiently scientifically reliable that its reports may be admitted in evidence." And finally concluded that they "are confident that ... all of the defendant's rights have been advanced and considered."<sup>163</sup>

196. This finding of the court in *Chun* - while nominally based on an Alcotest MK 111 - was based on their particular model "C". Clearly, it is comparatively more comprehensively specified and programmed than the one discussed above in relation to South Africa.

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<sup>160</sup> *Chun* order, 6 A. Note in our jurisdiction section 212 of the Criminal Procedure Act 51 of 1977 would assist.

<sup>161</sup> *Chun* order, 6B.

<sup>162</sup> As well as other fail-safe procedures such as "wet bath" testing of both IRC and ECC prior to each breath test, re-purging and re-testing of the machine being necessary if no blowing follows within three minutes of the prompt therefor being given and 11 attempts being allowed to collect two breath samples. Judgement, pages 27 – 30.

<sup>163</sup> Judgement, page 130. It is noteworthy that this judgement follows on lengthy interrogation of the machine and its workings by a Special Master who was tasked with the preparation of reports to assist the Court in making its decision. He considered several months of testimony and issued a report in February 2007 and a supplemental report in November 2007 after further examination of the software workings of the machine.



197. There was one consideration which was examined and rejected as unnecessary in *Chun*<sup>164</sup> which ought to be re-evaluated in light of the South African legislative framework: the use of a temperature probe designed to measure the temperature of the test subject's breath. As there is no conversion of a breath alcohol reading to a blood alcohol result required here for the purposes of prosecution, the benefits discussed there would not apply.<sup>165</sup>
198. Evidence was presented that the Alcotest 7110 MK 111 'Evidential' model as used in Germany, the manufacturer's homeland, is fitted with such a sensor<sup>166</sup>. This is designed to prevent a potential erroneous reading in subjects whose actual breath temperature does not correlate with the expected average of 34°C, either because the person's body temperature is not the expected 37°C, or because of the influence of the ambient environmental temperature.
199. This additional breath temperature 'module' measures, by means of sensors, the actual temperature of the person's breath as it leaves the mouth and compensates for the variation thereof from the expected 34°C by means of a scientific calculation so that the reported result is adjusted to prevent disadvantage to those affected. Experts there indicated that BrAC may increase by 5.5 – 6.8% for each 1°C above the expected 34°C<sup>167</sup>.

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<sup>164</sup> Discussion at judgement, page 65.

<sup>165</sup> The ratio of 2100:1 and truncation as opposed to rounding of the three decimal places.

<sup>166</sup> Exhibit H, page 4, Exhibit B pages 40, 46, 47 & 67

<sup>167</sup> See *Chun* judgement, page 68.

200. Since persons giving breath samples in South Africa do not benefit from the truncation and ratio used in Chun to convert the given breath alcohol reading into a blood alcohol result, an adequate substitute is required. The logical choice would be the addition of the breath temperature 'module' as used in the German Evidential model.

201. Addition thereof would also guard against irregular – as opposed to normal – breathing by a test subject. Evidence was presented that both hyper- and hypo-ventilation affects a person's breath temperature and therefore also the given result. It would also be an aid to the operator in that the test subject's breathing pattern would not require careful observation to notice irregular breathing.

202. It is noteworthy that the Evidential model requires two separate breath samples, spaced minutes apart, each of which is individually measured. It is deemed to be necessary, notwithstanding the ECC testing, to prevent possible false positive results from mouth alcohol.

203. I now turn to the final evaluation of the elements of the offence.

204. As stated above, there was a dispute as to whether the accused was in fact the driver of the motor vehicle in question. After considering all the evidence placed before me I have no hesitation to find, beyond a reasonable doubt, that the accused was in fact the driver of the particular vehicle.

205. I have not been referred to any case law on the definition of alcohol. The only evidence presented is in terms of the SANS 1793:2006 and the OIML R 126:1998 provisions which stipulate that the test applied, as in this instance, is for ethyl alcohol alternatively termed ethanol. Hence a test would need to be performed specifically for the presence of ethanol. The enquiry however does not end there, in order to accept the result reported by the Alcotest, I have to consider whether such is produced after a proper analysis of a sample of breath of the accused. This result must exclude any other type of substance which might mimic ethanol in its scientific make-up.

206. It is common cause that a possibility exists of contamination by interfering substances. The Alcotest is designed to detect interfering substances and programmed to report any presence thereof in the event that it exceeds the prescribed parameters. However this detection and reporting is dependent on the proper functioning and effective working of the ECC. In the instant matter it is common cause that the ECC is not calibrated by an accredited laboratory as prescribed in the Regulations. This does not satisfy the requirements of the RTA as read with the Regulations. A second breath sample, which would potentially be a safeguard apart from the ECC, is absent in this case. Therefore I am unable to find that the state proved beyond a reasonable doubt that the reported result reflected alcohol, as defined, on the breath of the accused and expressed in milligrams per 1000 millilitres.

207. The state is entitled to rely on the result obtained from any specimen of breath from the accused. Hence I must be satisfied that any reported result is from breath and nothing else, so as to be satisfied that it meets the requirement of section 65(5). We have heard evidence from the State that the Alcotest is designed not to report mouth alcohol expressed in milligrams per 1000 millilitres in the printout. The RTA is also clear that what should be measured is exhaled breath. This would exclude any reading for mouth alcohol.

208. The state relied on evidence that mouth alcohol would be detected by the Alcotest and reported as such, this was however, challenged by the direct evidence of their own expert<sup>168</sup> who conducted tests with a similar Alcotest and his evidence was undisputed that the Alcotest reported mouth alcohol as breath. It is uncontested that the presence of dentures in a test subject may increase the risk of the presence of mouth alcohol. It was never ascertained whether the accused had dentures. It is instructive to note that point 5.5.1(c) and Annex I of OIML R 126 makes provision for legal authorities to provide for procedures in this regard in their policy. In the instant matter the policy makers simple failed to do so.

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209. The question arises whether the Alcotest, absent the safeguards described above could render a result that could exclude an analysis of anything else but breath. The evidence of the expert on the experiments he performed, in my view must raise a reasonable doubt.

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<sup>168</sup> Dr. P Berman.

210. Alcotest, model number 8314647, must further comply with section 65(7) read with Reg 332, which prescribes type testing of the prescribed equipment. It is instructive to note that the SABS type tested a Dräger Alcotest 7110 MK 111RSA on 18 February 1998. The question arises whether this type testing was sufficient to comply with the said statutory provisions and regulations. It is common cause that the regulation at hand came into being after this type testing. Similarly the OIML R 126 applicable in this matter came into being in 1998 and was only confirmed at a much later date as pointed out above. The software for the machine in the instant matter, version 1.1 was only finalised in December 1999.

211. It is common cause that the operation of the machine that includes the analysis, calculations and results reported are software driven, hence the logical conclusion is that type testing should be done on the equipment as it is used in the field by law enforcement officials. The Alcotest as currently set up with software version 1.1 in contrast to the type tested software version 1.0 could not be a type approval in itself as envisaged by the legislation. The state sought to rely on the type testing certificate dated 18 February 1998. There is no indication that the type testing complied with the mandatory provisions of the OIML R 126:1998 which was applicable at the time of the alleged offence.

212. It is instructive to note that the typical sample that was submitted for testing and in respect of which the test report was issued was an Alcotest 7110 MK 111 RSA, this preceded the regulations of the RTA. The regulations issued after the type testing in 2003 made provision for a Dräger Alcotest 7110 MK 111 Germany. In the 2007 regulations which was applicable at the time of the alleged commission of the

offence no particular device was prescribed. It found its way back into the regulations in the 2010 regulations and again makes reference to the Dräger Alcotest 7110 MK 111 Germany, which is in any event not the device the test report refers to. *Prima facie* it seems that at no stage during the development of the regulations did it match the test report in question.

213. I return to the test report again and note some of the salient features thereof. It was approved two days before the alleged type testing report of the Alcotest, it needs to be noted that this device was built and developed in Germany and must have been shipped to our shores for type testing. Presumably the type testing was done after the standard was approved. I find it surprising that within two days compliance could be obtained. It is instructive to note that the manufacturer was represented in the group that made representations for the development of the standard. For purposes of compliance with the standard the accredited laboratory had to have regard to the operating instructions, as will become apparent later, the operating instructions in this instance, leave much to be desired. In as far as it relates to the testing for the operation requirements, it had to be tested multiple times and at various operating conditions. Having regard to the number of tests to be conducted and the frequency thereof I cannot accept the test report at face value in the absence of an analysis thereof and/or evidence that supports the conclusion.

214. The legislative framework that had to be complied with for purposes of this case is the OIML R 126:1998 which was incorporated in SANS 1973:2006 which replaced

SABS 1793:1998. The SABS standard was termed edition 1 and the SANS standard is termed edition 2. In 1998 however the OIML R 126 had not yet been incorporated into South Africa, hence it is inconceivable that the standard applied for purposes of the test report could be the same as the standard applied to the device for the use in the instant matter. Further to that one must have regard to the manner in which standards are developed by the OIML in the foreword to the OIML R 126 it is stated that the 1998 edition was developed by a subcommittee and was approved by another committee in 1997 and submitted to the conference body only in 2000 for formal sanction. I have also made reference to the differences between the SABS 1793:1998 and SANS 1793:2006 and no evidence was led that type testing of any sort was conducted between 1998 and 23 January 2010 when the incident occurred.

215. Reg 332 (3) of the 2007 edition provided for a presumption when a certified test report is submitted. The test report submitted here has as a footnote the following: "this report relates only to the specific sample(s) tested as identified herein. It does not imply SABS approval of the quality and/or performance of the item(s) in question and the test results do not apply to any similar item that has been tested." Because of the disclaimer by the accredited laboratory, this certificate can therefore not be one as envisaged in Reg 332 (3).

216. The State further sought to rely on the premise that no type-testing by the SABS or SANAS was in fact necessary since the OIML itself had already approved the Dräger Alcotest 7110 MK 111 as compliant with its R 126:1998. As indicated with

reference to Chun, except for the model number, the type number was the same. The Alcotest in Chun was set up totally different to the one in South Africa. So that in itself proves that the state's argument cannot prevail. I note however that no test report in the format required by R 126 Annex E was ever proffered.

217. Based on the OIML certificate of compliance produced, I can only conclude that that a Dräger Alcotest 7110 MK 111 basic specification model, loaded with whatever operating system it so comes, is in principle capable of producing the desired result. Since I cannot find that the Dräger Alcotest 7110 MK 111 RSA model number 8314647 with software version 1.1as used in this case, was ever tested, the State's argument cannot prevail.

218. Accordingly, I do not need to deal with the question of whether the OIML testing facility is in fact "an accredited test laboratory" or whether the testing would, in terms of Reg 332, have to be done by SANAS and "in terms of SANS 1793" – which is in turn the wholesale adoption of OIML R 126:1998. A document was produced that suggest that the OIML testing facilities would comply with a testing laboratory in terms of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act 19 of 2006. This document was handed up during argument and no evidence was led in respect of the basis of which the suggestion is made. The document is in the form of a "to whom it may concern" letter which seems to have been produced during September 2010. It makes mention that the OIML certification is done by the Laboratoire nationale De Métrologie Légale and by virtue



of its accreditation with another body and that body's membership of another organisation, it falls within the prescripts of act 19 of 2006. Not only is this letter inadmissible as evidence but even if it was admissible, it is so vague that it would not have moved me.

219. Reg 332 requires further of the state to prove that the equipment used was calibrated or verified to establish the accuracy and traceability of such equipment by an accredited laboratory. It is further required in terms of the prosecution guidelines and the Dräger instruction manual that calibration should take place every 6 months. In terms of the prosecution guidelines the calibration should take place after any maintenance and repairs have been done.

220. Reg 332A makes provision for the mere production of a certificate by an accredited laboratory to provide *prima facie* proof of such calibration. What is of concern, in this matter, is that adjustments before and after calibration were effected by the manufacturer who is not an accredited laboratory. It is of importance in any criminal matter, where scientific or technical equipment is used in the prosecution of a person, that independent calibration and/or verification be done by accepted and accredited laboratories to ensure that courts can rely on the results produced by such equipment. It is a principal of our law that justice must not only be done but be seen to be done. In appropriate cases a perception of collusion could be detrimental to the administration of justice. I have pointed out in the summary that further to this concern proper record keeping was also neglected. In any event the manufacturer and the prosecution claimed that the effective and proper operation of the ECC

enhances the reliability of the result produced, it then becomes more worrisome that this component in particular is never independently verified but rather adjusted by Dräger after calibration of the IRC by NMISA.

221. In the event that prescribed equipment is properly calibrated it should not only function properly but be operated by a person who is properly qualified to operate such equipment. I have pointed out above that the operator lacked sufficient training in my view and simply failed to follow standard operating procedures as prescribed in the operator's manual, the OIML and the prosecution guidelines. To this extent such failure would vitiate a reliable result.

222. There is an operator's statement that ought to be completed when a person is tested on the Alcotest. On the evidence presented this statement was not completed in terms of a sworn statement and not all the pages of the statement were presented to the court.

223. In terms of the operator's certificate it is presumed that the operators have undergone training in order to operate the Alcotest effectively. The certificate of the operator that performed the test on the accused was admitted into evidence, however it is noted that this certificate is dated 12 February 1999. The Alcotest in question, was programmed with software version 1.1 which was finalised in December 1999. There is no certificate to prove that the operator was trained in terms of the software version 1.1 on the Alcotest that was used in producing this particular result.

224. The factual findings herein represent the unanimous opinion of the court.

225. I am of the view that save for the fact that the accused was the driver of the motor vehicle on a public road on the day in question, the state failed to prove any of the other elements of the offence as charged. Consequently the accused is acquitted of the charge.

In closing I would like to state that I am indebted to my assessor Advocate Sascha Curic for her service in this matter and the assistance given to the court. Ms Nikki Ramages-Hanafey, the law researcher of this Court for her diligent and effective research in preparing this judgment. I am aware that the accused was assisted by Legal Aid South Africa and counsel for the defence lead by Advocate Mitchell SC, have offered their services *pro bono* who appeared for the accused. The prosecution under the leadership by Advocate Downer SC, have taken the initiative to bring this matter to the High Court. Both teams are thanked for the hard work and the manner in which they presented this case. I am of the view that your contribution enhances access to justice and will contribute to the development of our law.

A handwritten signature in black ink, consisting of a series of loops and a final flourish, enclosed within a large, horizontal oval shape.

Erasmus, J