Certification of the DataMaster DMT		
Type: SOP	Effective: 02/28/2022	Applies to: Breath Alcohol

Previously LAB SOP BAC-14

PURPOSE: The Division of Criminal Investigation (DCI) Criminalistics Laboratory certifies each instrument according to State law[8.1] . Certification, and recertification, is necessary to ensure the continued proper operation, accuracy and precision of the DataMaster DMT.

DEFINITIONS:

- **Margin of Error:** A measure, quantity or degree of difference between an observed value and the true value of a quantity. Also known as instrument bias.

1.0 SUMMARY

The Iowa DCI Criminalistics Laboratory is responsible for the certification of any evidential breath-testing instrument used within the state of Iowa. One such instrument approved for use is the DataMaster DMT manufactured by National Patent Analytical Systems, Inc. (per Iowa Administrative Code, Chapter 157-7.2(3)). All devices so used must be certified to be in proper working order within a period established in the Iowa Administrative Code, Chapter 157.

2.0 REAGENTS

2.1 Ethanol solutions [8.2]

3.0 APPARATUS and EQUIPMENT

3.1 Dry gas ethanol tank
3.2 Alcohol simulators (Guth 10-4D, or equivalent)
3.3 Assortment of tools including, but not limited to: screwdrivers, pliers, wrenches, barometer, etc.
3.4 DataMaster DMT
3.5 Spare parts for the DataMaster DMT

4.0 SAFETY CONSIDERATIONS

Exercise normal safety precautions when working with electricity and the possibility of electric shock.

5.0 PROCEDURE

5.1 Certification of the instrument is valid for a period stated in the Iowa Administrative code 661-157.2(2)
5.2 Re-certification of an instrument may be performed either on-site or at the DCI Criminalistics Laboratory.

5.2.1 During re-certification procedure, access to the instrument shall be limited to DCI personnel and law enforcement officers.

5.3 If the instrument is inoperable, necessary maintenance may be performed prior to re-certification procedure.

5.4 Minimum requirements for re-certification include:

5.4.1 A diagnostic test indicating that the instrument is within specifications established by the manufacture.

5.4.1.1 The barometer on the DataMaster DMT can be verified using a reference barometer (manometers).

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5.4.2 **Verification of "As Found" Condition** (if possible): One to three (1-3) ethanol solutions will be measured. The solutions used for this verification may be used in the calibration of the same instrument if no changes affecting the measurement of ethanol are made.

5.4.3 **Adjustment** (if necessary): If the "as found" verification was successfully completed and the average result is greater than or equal to 3% difference of the expected ethanol concentration, an adjustment will be performed. If the results are less than 3% from the expected ethanol concentration, an adjustment may still be performed at the analyst's discretion. The solution used for the adjustment will not be used for the calibration, or verification of calibration, on the same instrument.

5.4.4 **Calibration, or Linearity Check:** A minimum of a four (4) ethanol solutions with concentrations between 0.020 and 0.500 g/210 L ran a minimum of five (5) times per concentration. The calibration made contain results of the initial verification. The correlation coefficient (R^2) of the calibration, or linearity check, must be a minimum of 0.995, using the averages results obtained by the instrument at each concentration.

5.4.5 **Verification of Calibration:** One dry gas ethanol tank will be measured a minimum of five (5) times. The results must fall within 0.004 g/210 L of the target ethanol concentration. The dry gas ethanol tank used for this verification will not be used for the calibration, or adjustment, of the same instrument.

5.4.6 **Radio Frequency Interference Test:** Using an officer's radio or a portable handheld two-way radio, check that the RFI setting is acceptable. If no RFI is obtained, reset the RFI sensitivity and retest.

5.4.7 **Interference Check:** Perform an interference check with a wet bath solution of a known ethanol concentration, containing approximately 200 microliters of acetone or isopropyl alcohol, or approximately 100 microliters of a combination of both. Results of the test shall indicate "Interference Detected."

5.4.8 **Zero Breath Test:** The analyst shall perform a breath test entering fictitious information (simulated data similar to the real data an officer would enter) into the DataMaster DMT. The test must show that a zero (0) alcohol reading was obtained, the minimum breath volume was capable of being met, and that the DataMaster DMT printout is showing all relevant information (e.g. results, graph, typed in information, etc.).

5.4.9 A diagnostic test at the end of the re-certification, indicating that the instrument is within specifications established by the manufacturer.

5.5 Additional maintenance may be necessary to ensure that the instrument is in proper working order. Examples of these may include:

5.5.1 Replacement of parts
5.5.2 Setting of voltages
5.5.3 Analysis of additional ethanol solutions of different alcohol concentrations

5.6 The Official Certification Report[8.6] shall be generated within the LIMS maintained by the DCI Criminalistics Laboratory. The original will be kept within the DCI Criminalistics Laboratory. Copies of the Official Certification Report shall be accessible to County Attorneys and the Department of Transportation via the LIMS and/or the DCI Website.

6.0 INTERPRETATION OF RESULTS

Not applicable.

7.0 QUALITY CONTROL

7.1 Ethanol solutions must be prepared fresh after fourteen (14) days of use or earlier.
7.2 Prepared ethanol solutions shall be documented on the BA Form "Ethanol Solution Preparation Log,"[8.3] which contains:

7.2.1 Date the solution was prepared
7.2.2 Solution number
7.2.3 Concentration of the solution
7.2.4 Control or Lot numbers of the purchased ethanol standard used to make the solution
7.2.5 Bottle number of the ethanol standard
7.2.6 Initials of the analyst who prepared the solution

7.3 Purchased ethanol standards are typically accompanied by a "Certificate of Analysis" supplied by the manufacturer. The DCI Laboratory Breath Alcohol Section shall retain these certificates.

7.3.1 The "Certificate of Analysis" shall be scanned into the LIMS.

7.4 The margin of error of the instrument will be determined at the time of certification.

7.4.1 These calculations may be done by the analyst or the DataMaster DMT.
7.4.2 For alcohol concentrations 0.080 g/210L and lower, subtract the average of the results from the expected alcohol concentration.
7.4.3 For alcohol concentrations 0.081 g/210L and greater, take the average of the results and subtract this from the expected concentration, then divide this value by the expected concentration, and then multiply by 100.
7.4.4 Determine this for each level of standard tested.

7.4.5 The margin of error shall be no greater than +/- 0.004 or 5%, whichever is greater.

7.5 Appropriate data generated by the DataMaster DMT is to be saved and kept in a file located at the DCI Criminalistics Breath Alcohol Section, along with the certification/re-certification report for that particular instrument. This data may include, but is not limited to:

7.5.1 A completed "DataMaster DMT Certification Check Sheet" [8.4]
7.5.2 Data generated from Section 5.4.
7.5.3 Any other information collected by the analyst examining the instrument used to make a determination that the instrument is in proper working order.

7.6 The printouts generated by the DataMaster DMT shall be scanned into the appropriate instrument file within the LIMS system currently in use at the DCI Criminalistics Laboratory.

7.7 The maintenance record shall be updated within the LIMS to include the date the instrument was (re)certified and any maintenance, repairs and testing done to the instrument (refer to Breath Alcohol SOP "Record Keeping" [8.5]).

7.8 Input the results of the ethanol solutions from the recertification into the Excel program following the procedure set forth in the Breath Alcohol SOP "Record Keeping." [8.5]

8.0 REFERENCES

8.1 Iowa Administrative Code, Chapter 661 – 157
8.2 Breath Alcohol SOP "Certified Simulator Alcohol Reference Solutions"
8.3 Breath Alcohol Form "Ethanol Solution Preparation Log"
8.4 Breath Alcohol Form "DataMaster DMT Certification Check Sheet"
8.5 Breath Alcohol SOP "Record Keeping"
8.6 Breath Alcohol Form "Breath Alcohol DMT Certification Report"

9.0 COMMENTS

9.1 Re-certification of the DataMaster DMT may occur more frequently than a period of once a year.

9.2 Values of the ethanol standards used during verifications, adjustments, and calibrations of the DataMaster DMT will be the values determined in Section 7.4 of the Breath Alcohol SOP "Certified Simulator Alcohol Reference Solutions." [8.2]