

Solving the Mysteries of Ignition Interlock

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Ignition Interlock Vendor Oversight Liaison

Minnesota Department of Public Safety

2015 TDZ Workshops



Ignition Interlock Programs

- All 50 states have an Ignition Interlock Program
 - Administrative
 - Court based
 - Hybrid
- NHTSA model specifications released in May 2013
- NHTSA program guideline released November 2013



Ignition Interlock Devices



Ignition Interlocks are designed to protect the public by incapacitating drunk drivers



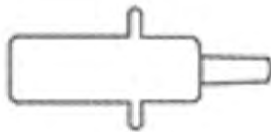
What is an Ignition Interlock?

- > An ignition interlock is a breath-testing device attached to a car's starter
- > It prevents the car from being started when a pre-set level of alcohol is detected in the breath sample provided by the driver of the vehicle



Ignition Interlock Operation

A driver must blow into the mouthpiece of the device



The device checks the driver's breath for measurable alcohol



If measurable alcohol is detected, the vehicle will not start



Fail Setpoint



Sober drivers will be able to operate the vehicles normally



.020 BrAC

**TOWARD
ZERO
DEATHS**

Breath Sample

- Breath sample consists of 1.5 liters of breath
 - The same sample size as most evidential breathalyzers
- To assist in preventing non-human breath samples, devices employ the following types of sample acceptance
 - Hum Tone
 - Humming and blowing at the same time
 - Blow and Suck Back
 - Blowing for 3-5 seconds and then sucking back for 2-3 seconds, then blow again for 1-2 seconds



MN Ignition Interlock Devices

- Initial sample – MN **Fail Point .020 BrAC**
- Second sample (rolling re-test) in 5-7 minutes
- Random re-test every 15-45 minutes
- Photos are captured with each sample
- Driver is given 10 minutes to provide a re-test
 - Warning lights
 - Audible tone
 - Worded text



MN Ignition Interlock Devices



- Device must be downloaded and calibrated every 30- 60 days or the device will go into “lock out” in 5-7 days
 - Lock Out does not allow the operator to start the vehicle until the device has been serviced
- Early recall “lock out in 5 days” occurs when certain violations are recorded
- Three minute stall protect



Benefits and Limitations

➤ Benefits

- More than 10 significant evaluations of interlock programs have demonstrated reductions in recidivism ranging from 35-90%; an average reduction of 64% (Willis et al. 2005)
- Reduces the economic impact of impaired driving by \$3 - \$7 for every \$1 spent
- Provides a pathway for legal driving (70% will drive illegally)

➤ Limitations

- **ALONE** long term effect on reducing DWI re-offense is low 25%
- Should be coupled with effective behavior changing program
 - Drug and alcohol courts
 - Treatment

Participation rates - 20,000+ eligible - 8,000+ participants



Good Ignition Interlock Programs

- View ignition interlocks as a core component in any drunk driving strategy
- Prohibit semiconductor sensors
- Utilize a certification and approval process for devices and vendors
- Emphasis on education for lead practitioners and for public
- Note interlock restriction on driver license
- Service in rural areas



Good Ignition Interlock Programs

- Vendor Oversight program
- Indigent funding available and rely on multiple criteria for determination
- Automated standardized reporting
- Inclusion of screening/assessment and treatment for long-term risk reduction
- View the Law Enforcement community as a partner



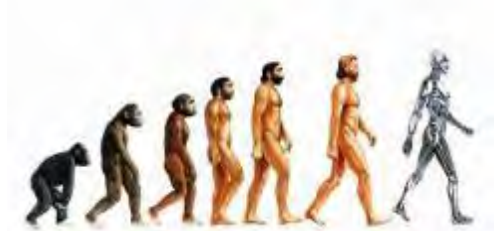
Good Ignition Interlock Programs

- Increased emphasis on education:
 - For all program/agency staff
 - Public education is essential to clarify goals and shape perceptions of program.
 - Offenders and family
 - UK study, offenders agreed device:
 - stopped them from driving drunk;
 - reduced their drinking and helped change drinking habits;
 - invoked serious thought about drinking habits;
 - Investment in training and informational materials.



II Evolution and Growth

- Increase growth in installations
- Ongoing advances in research, technology
- Increasingly become a core component in any drunk driving strategy
- Program expansion to include more drivers
- Increased program ownership and attention to operational practices by authorities across the board
- Increased educational efforts
- Establishment of vendor oversight programs



Minnesota Program History

- Minnesota starts an administrative pilot program in 2007
- Legislative directive in 2011
- Minnesota court involvement continues to increase
- 8000+ participants



Minnesota Department of Public Safety Ignition Interlock Vendor Oversight Program

Jim Beauregard
Vendor Oversight Liaison



What is Vendor Oversight?

Vendor Oversight is the assurance of quality control on many levels.



Vendor Oversight Includes

- Review of best practices from other states
- NHTSA and state standards for interlock devices
- Vendor/service centers
- Calibration/testing
- Circumvention Investigations
- Field testing
- Education



Device Certification Standards

- **Device overview**
 - Calibration
 - Operating parameters
 - Anti-circumvention standards
- **Independent testing**
 - NHTSA 2013 standards
 - MN standards – independent certification report is required



Vendor Visits

- MN standards/rules review
- Service center technician training materials
- Background checks
- Lockout code usage - who has codes?
- Mobile service
- Calibration
- Device version/firmware/software



Service Center Inspection

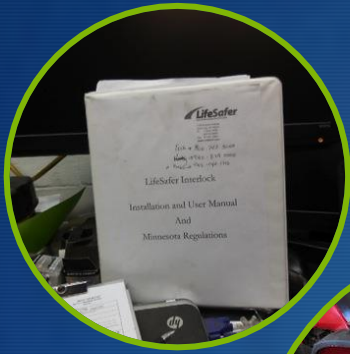
- Record retention
- Client education
- Materials storage



Service Center Inspection

Installation/calibration/technician standards

- Installation manuals
- Tools
- Work area
- Labels/shrink-wrap
- Wiring (connections)
- Dry gas/Wet bath
- Technician standards
 - Knowledge
 - Communications



Calibration of Ignition Interlock

- Calibration is a process by which a tester uses an alcohol reference sample to determine if a interlock device accurately measures the BrAC of a user
 - Calibration interval. The maximum time period that an alcohol interlock may be used without a calibration check
 - Calibration stability. The ability of an alcohol interlock to hold its correct calibration over a defined time period
 - Service interval. The maximum time period that an alcohol interlock may be used without maintenance or data download



Calibration of Ignition Interlock

- Who is calibrating the interlock?
- How were they trained?
- Do they understand the importance of calibration?
 - Two common methods used to calibrate interlock devices
 - Dry Gas
 - Wet Bath



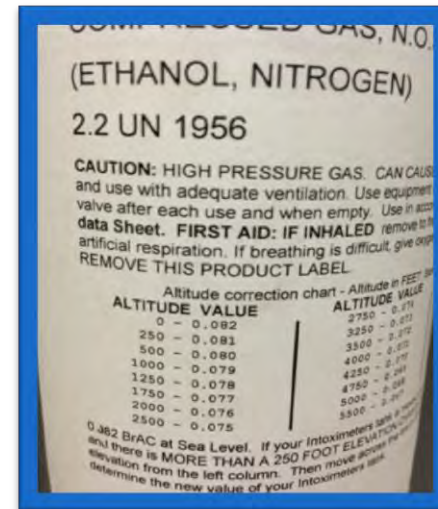
Dry Gas Calibration

- Introduction of a pressurized dry standard gas of a specified concentration of alcohol into the interlock device and compares the resulting BrAC reading with the alcohol percentage in the dry gas mix.



Dry gas calibration

Many gas manufacturers will provide chart for pressure adjustment due to altitude.



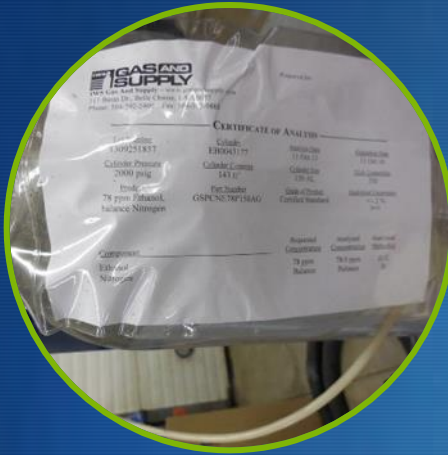
Breath alcohol concentration (BAC) adjusted for altitude

| Altitude (ft) | Pressure (mmHg) | .030 g/210L | .050 g/210L | .080 g/210L | .100 g/210L |
|---------------|-----------------|-------------|-------------|-------------|-------------|
| 0 | 760 | 0.030 | 0.050 | 0.080 | 0.100 |
| 250 | 753 | 0.029 | 0.049 | 0.079 | 0.099 |
| 500 | 747 | 0.029 | 0.049 | 0.078 | 0.098 |
| 750 | 740 | 0.029 | 0.048 | 0.077 | 0.097 |
| 1000 | 734 | 0.028 | 0.048 | 0.077 | 0.096 |
| 1250 | 728 | 0.028 | 0.047 | 0.076 | 0.095 |
| 1500 | 722 | 0.028 | 0.047 | 0.076 | 0.095 |
| 1750 | 716 | 0.028 | 0.047 | 0.075 | 0.094 |
| 2000 | 709 | 0.027 | 0.046 | 0.074 | 0.093 |
| 2500 | 697 | 0.027 | 0.045 | 0.073 | 0.091 |
| 3000 | 685 | 0.027 | 0.045 | 0.072 | 0.090 |
| 3500 | 673 | 0.026 | 0.044 | 0.070 | 0.088 |
| 4000 | 662 | 0.026 | 0.043 | 0.069 | 0.087 |
| 4500 | 650 | 0.025 | 0.042 | 0.068 | 0.085 |
| 5000 | 639 | 0.025 | 0.042 | 0.067 | 0.084 |
| 5500 | 628 | 0.024 | 0.041 | 0.066 | 0.082 |
| 6000 | 617 | 0.024 | 0.040 | 0.064 | 0.081 |
| 6500 | 606 | 0.023 | 0.039 | 0.063 | 0.079 |
| 7000 | 595 | 0.023 | 0.039 | 0.062 | 0.078 |
| 7500 | 584 | 0.023 | 0.038 | 0.061 | 0.076 |
| 8000 | 574 | 0.022 | 0.037 | 0.060 | 0.075 |
| 8500 | 564 | 0.022 | 0.037 | 0.059 | 0.074 |
| 9000 | 554 | 0.021 | 0.036 | 0.058 | 0.072 |
| 9500 | 544 | 0.021 | 0.035 | 0.057 | 0.071 |
| 10000 | 534 | 0.021 | 0.035 | 0.056 | 0.070 |
| 10500 | 524 | 0.020 | 0.034 | 0.055 | 0.068 |
| 11000 | 514 | 0.020 | 0.033 | 0.054 | 0.067 |
| 11500 | 505 | 0.019 | 0.033 | 0.053 | 0.066 |
| 12000 | 496 | 0.019 | 0.032 | 0.052 | 0.065 |





Dry Gas Calibration Inspection



Dry Gas

- Records
- Storage
- Pressure
- Hoses
- Testing
- Altitude

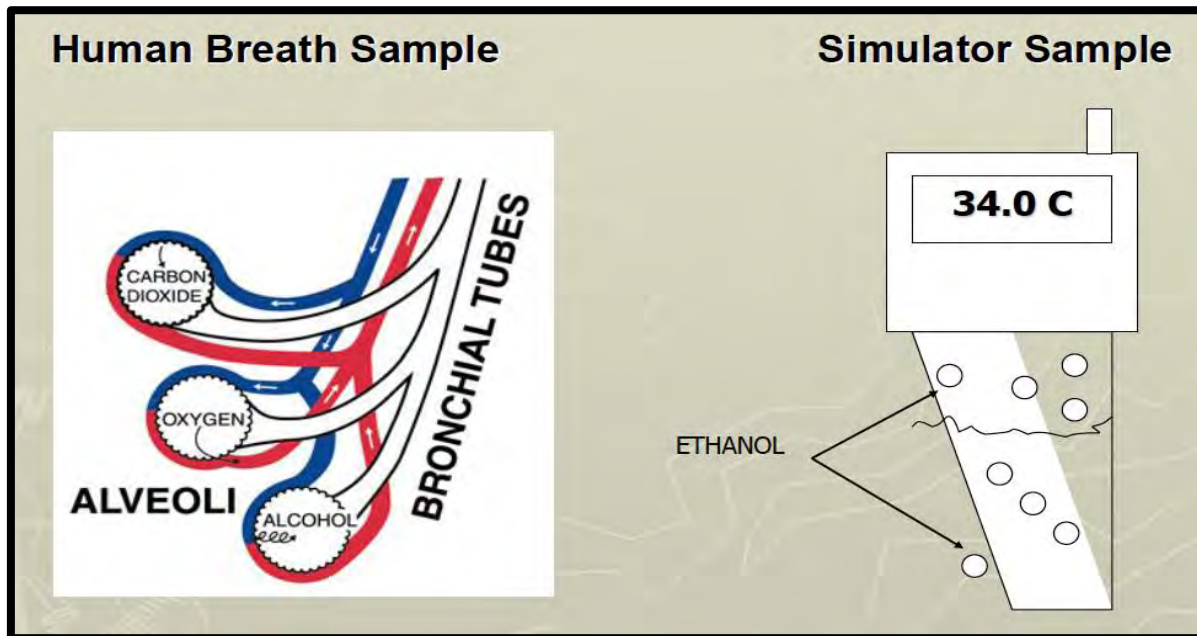
Wet Bath Calibration

An electronically temperature controlled instrument that when used with an Alcohol Reference Solution, will provide precise and accurate calibration standards for use with alcohol breath test instruments.



Why We Use Simulators

- Provide a sample that closely resembles a human breath sample
- Ensure that the Breath Alcohol instrument you are using is working/calibrated correctly





Wet Bath Calibration Inspection

Wet Bath Simulator

- Solution standards/records
- Hoses
- Secure connections
- Temperature
- Device calibration
- Cleanliness
- Storage
- Condensation



Condensation In Simulator Tubing



As the ethanol molecules from the headspace pass through the tubing filled with moisture, less molecules enter the device, therefore calibration may not be accurate.



Device Calibration Inspection



Wet bath simulators

- Temperature issues
- Calibration dates

INSPECTION REPORT

Ignition Interlock Service Center

| | | | | | |
|---------------------------------------------------------------|---------|----------------------|----------------------------------------------|-----------------|----------------------------------|
| Inspector | | Inspection Date | | Vendor | |
| Service Center Name | | | | Phone Number | |
| Service Center Physical Address | | | | | |
| Document/Records Review Location | | | | | |
| Technician(s) Present Yes | | No | | | |
| Simulator Manufacturer and Model | | Serial Number | Temperature Measured °C Displayed °C | | Seal Pressure Test Good Leaks |
| Reference Solution/Gas Manufacturer | Storage | Tank Pressure psi | Lot Number | Expiration Date | Predicted Value |
| Documentation on file? | | | | Verified YES | NO |
| | | | | N/A | |
| Corrective action(s) will be noted below each section. | | | | | |
| | | Description | | | |
| Device | | | | | |
| Problems | | | | | |
| Firmware Version | | | | | |
| Corrective Action: | | | | | |
| Installation Standards and Specifications | | | | | |
| Equipment | | | | | |
| Tech support | | | | | |
| Vendor support | | | | | |
| Labels/Shrink | | | | | |
| Problems | | | | | |
| Corrective Action: | | | | | |
| Camera Standards | | | | | |
| Mounts | | | | | |
| Software | | | | | |
| Problems | | | | | |
| Corrective Action: | | | | | |
| Maintenance and Calibration | | | | | |
| Clients | | | | | |
| Downloads | | | | | |
| Calibration | | | | | |
| Problems | | | | | |
| Circumvention | | | | | |
| Corrective Action: | | | | | |



INSPECTION REPORT

Ignition Interlock Service Center

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Client Education | |
| Handouts | |
| Videos | |
| Separate Area | |
| Training | |
| Corrective Action: | |
| Service Center | |
| Cleanliness | |
| Fee Sheet | |
| | |
| Corrective Action: | |
| Technician | |
| Training | |
| Corrective Action: | |
| NOTICE AND ORDER OF ADMINISTRATIVE ACTION | |
| <p>I have received a copy of the inspection report. If deficiencies were noted, this report constitutes a written warning. I understand that failure to make any correction(s) noted above may result in enforcement action by the MN Department of Public Safety.</p> <p>Received By: _____</p> | |

PURSUANT TO SECTION _____

THE BASIS FOR THIS ACTION IS AS FOLLOWS:

Technician Name: _____

Address: _____ City: _____ State: _____ Zip: _____ Email

Address: _____ Phone #: _____ Fax #: _____

Comments: _____

The effective date of this action is _____. I hereby
acknowledge receipt:

Service Center Representative or Technician Signature

Inspector's Signature



Circumvention Investigation

- **All devices record the following information**
 - Any efforts to disable the device
 - Date/time of vehicle use
 - Pass/fail records
 - BrAC Levels
 - Start and stopping of vehicle engine
 - Service reminders “Lock Out Mode”
 - Date service performed
 - Photos
 - Calibration data



Database Access

The screenshot shows the Smart Start website interface. At the top, there is a navigation menu with links for HOME, LOCATIONS, PRODUCTS, INFORMATION FOR CLIENTS, INFORMATION FOR ATTORNEYS, MONITORING AUTHORITIES, OTHER SERVICES, and ABOUT US. The main heading reads "IN-HOM - YOUR ALCOHOL MONITORING ALTERNATIVE". Below this, two statistics are displayed: "ALCOHOL FREE STARTS: 456,795,931" and "ALCOHOL STARTS PREVENTED: 6,276,042". A "CONTACT US TODAY 800.880.3394" button is visible. The login section includes the text "Welcome to Smartweb" with links for "Smartweb EU" and "Smartweb AU". It prompts users to "Please Login with username and password or click here to register a new account." and provides input fields for "Email:" and "Password:" with a "Login Now" button. A link for "If you have lost or forgotten your password click here" is also present. A small disclaimer box at the bottom of the login area states: "Please call any of our customer care representatives at 1-800-880-3394 if you have any questions or comments. This site is designed for authorized personnel only. Unauthorized use may subject you to criminal prosecution. Unauthorized interception, review, use, disclosure or distribution of any state information contained within this system, and/or its attachments, is strictly prohibited. Any use of information listed here without express written approval of Smart Start, Inc. is prohibited and could constitute a breach in legal responsibility with Smart Start, Inc. in local, state, and federal laws. If you are unsure about compliance with this disclaimer you should contact Smart Start, Inc. immediately."



Circumvention Investigations

| | | |
|---------------------|------------------------------|------------------------|
| 02/22/2014 09:53:38 | Initial Test-Violation | 0.044 |
| 02/22/2014 09:53:39 | Temporary Lockout Start | |
| 02/22/2014 09:54:13 | Disconnected Head | |
| 02/22/2014 09:54:42 | Engine Start | 13.053v |
| 02/22/2014 09:58:42 | Circumvention | |
| 02/22/2014 10:02:42 | Circumvention | |
| 02/22/2014 10:06:42 | Circumvention | |
| 02/22/2014 10:10:42 | Circumvention | |
| 02/22/2014 10:14:42 | Circumvention | |
| 02/22/2014 10:18:38 | Connected Head | |
| 02/22/2014 10:18:44 | Connected Head | |
| 02/22/2014 10:18:45 | Violation Grace Period Start | 7200 minutes remaining |
| 02/22/2014 10:19:12 | Rolling Retest Requested | |
| 02/22/2014 10:19:15 | Picture Requested | Test Started |
| 02/22/2014 10:19:35 | Rolling Retest-Violation | 0.031 |
| 02/22/2014 10:20:09 | Disconnected Head | |
| 02/22/2014 10:22:41 | Circumvention | |
| 02/22/2014 10:23:19 | High Battery Voltage | 13.798v |
| 02/22/2014 10:23:19 | Engine Stop | 13.798v |
| 02/22/2014 11:15:00 | Engine Start | 14.474v |
| 02/22/2014 11:18:59 | Circumvention | |
| 02/22/2014 11:22:59 | Circumvention | |
| 02/22/2014 11:26:59 | Circumvention | |
| 02/22/2014 11:30:59 | Circumvention | |
| 02/22/2014 11:34:59 | Circumvention | |
| 02/22/2014 11:38:59 | Circumvention | |
| 02/22/2014 11:42:59 | Circumvention | |
| 02/22/2014 11:46:59 | Circumvention | |
| 02/22/2014 11:50:43 | Connected Head | |
| 02/22/2014 11:50:49 | Connected Head | |
| 02/22/2014 11:50:50 | Violation Grace Period Start | 7108 minutes remaining |
| 02/22/2014 11:50:50 | Circumvention | Circumvention |
| 02/22/2014 11:51:03 | PC Connected | |

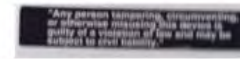
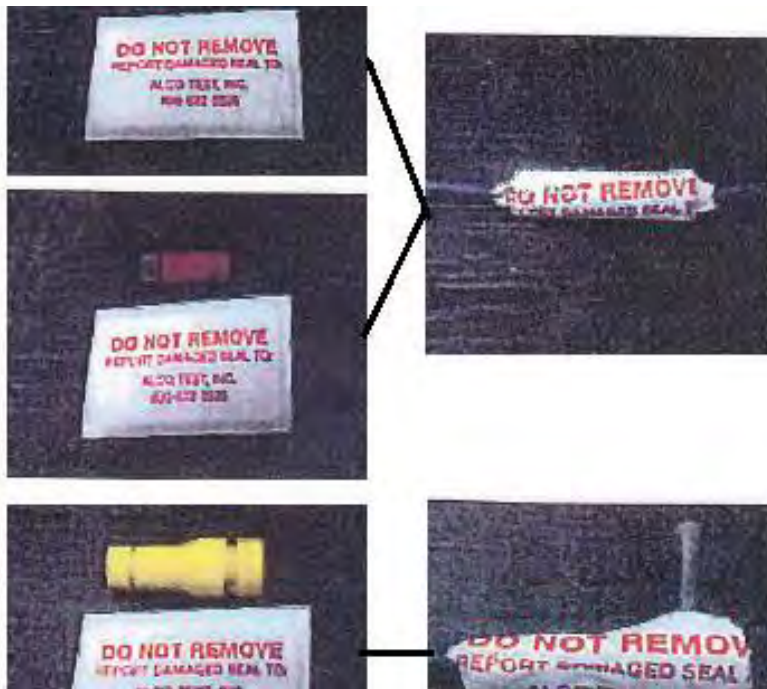


Circumvention Investigations

| 73 Smartlog Events | | |
|---------------------|------------------------------|------------------------|
| Timestamp | Type | Details |
| 02/22/2014 11:54:45 | PC Disconnected | |
| 02/22/2014 11:54:48 | Power On | |
| 02/22/2014 11:54:50 | Engine Start | 14.477v |
| 02/22/2014 11:55:55 | Connected Head | |
| 02/22/2014 11:55:56 | PC Connected | |
| 02/22/2014 11:56:43 | Connected Head | |
| 02/22/2014 11:57:13 | Rolling Retest Requested | |
| 02/22/2014 11:57:16 | Picture Requested | Test Started |
| 02/22/2014 11:57:36 | Rolling Retest-Violation | 0.221 |
| 02/22/2014 11:58:09 | Disconnected Head | |
| 02/22/2014 12:00:38 | Circumvention | |
| 02/22/2014 12:04:38 | Circumvention | |
| 02/22/2014 12:08:38 | Circumvention | |
| 02/22/2014 12:12:38 | Circumvention | |
| 02/22/2014 12:16:38 | Circumvention | |
| 02/22/2014 12:20:38 | Circumvention | |
| 02/22/2014 12:24:38 | Circumvention | |
| 02/22/2014 12:27:23 | Engine Stop | 13.758v |
| 03/20/2014 20:02:11 | Connected Head | |
| 03/20/2014 20:02:11 | Violation Grace Period Start | 7200 minutes remaining |
| 03/20/2014 20:02:35 | Picture Requested | Test Started |
| 03/20/2014 20:02:43 | Initial Test-Pass | 0.000 |
| 03/20/2014 20:03:02 | Engine Start | 14.291v |
| 03/20/2014 20:03:03 | Picture Requested | Vehicle Started |
| 03/20/2014 20:04:26 | High Battery Voltage | 13.476v |
| 03/20/2014 20:04:26 | Engine Stop | 13.476v |
| 03/20/2014 20:04:53 | Connected Head | |
| 03/20/2014 20:04:53 | Violation Grace Period Start | 7197 minutes remaining |
| 03/20/2014 20:05:17 | Picture Requested | Test Started |
| 03/20/2014 20:05:25 | Initial Test-Pass | 0.000 |



Circumvention Prevention



Filtered air samples



Filtered air samples



Circumvention Investigations



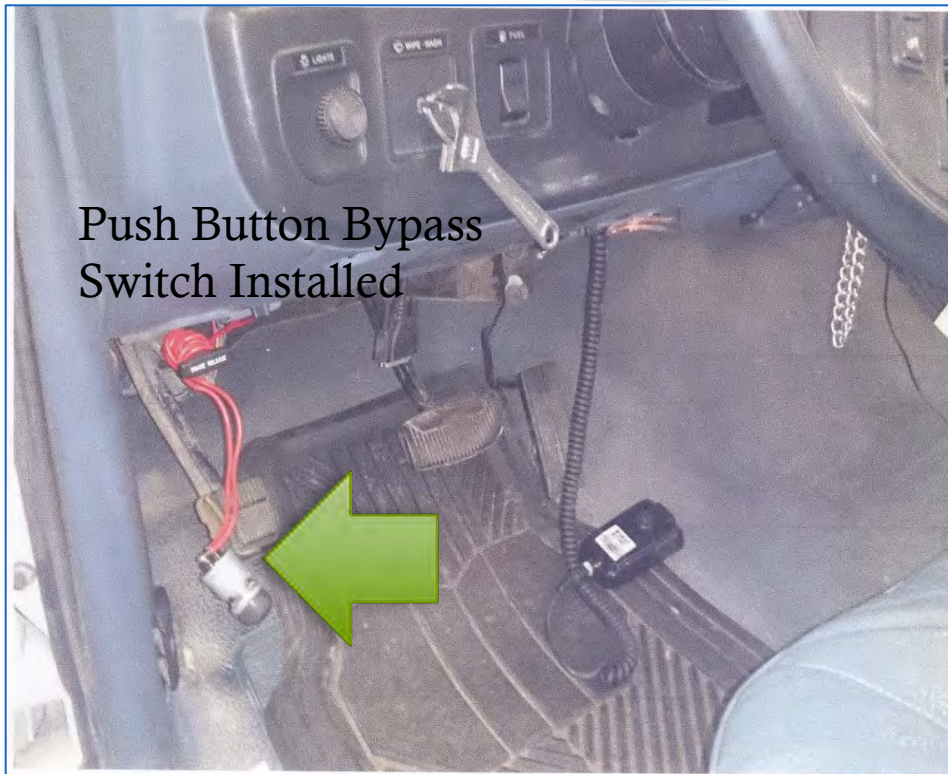
- Altered Breath Sample: Stored Air
- Utilized an Air Mattress pump to supply the exhaled breath sample
- When the inhale portion was necessary, the air nasal was removed and the individual supplied the inhale portion
- The vehicle was able to start with the individual altering the submitted breath sample

Circumvention

Hard wire bypass or "Starter bridge"



Circumvention Investigations



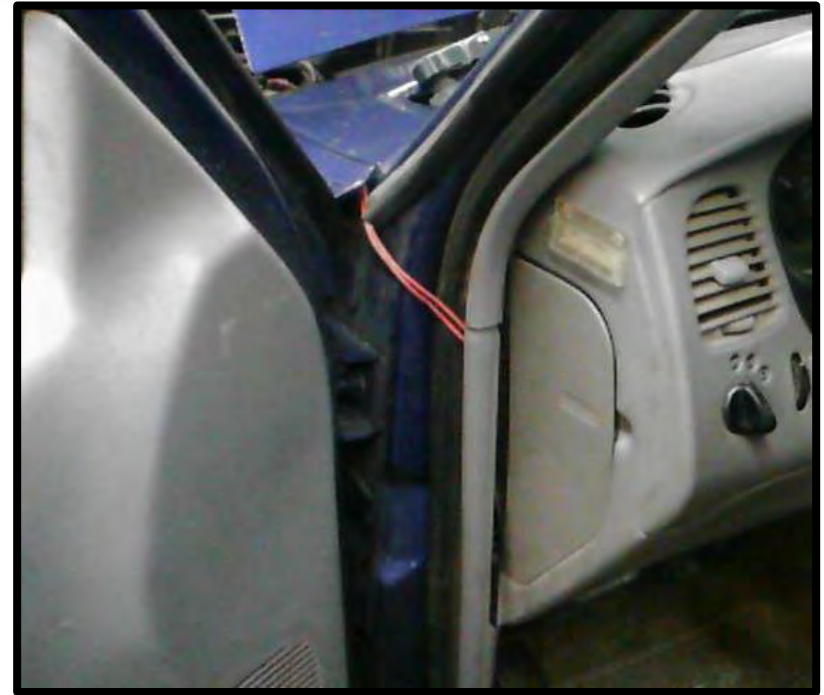
Push Button Bypass
Switch Installed

A Bypass Switch interrupted the ground and hot wires prior to reaching the BAIID

When the switch was turned on: it closed the ignition circuit, allowed the vehicle to start

The BAIID did not recognize the vehicle was on

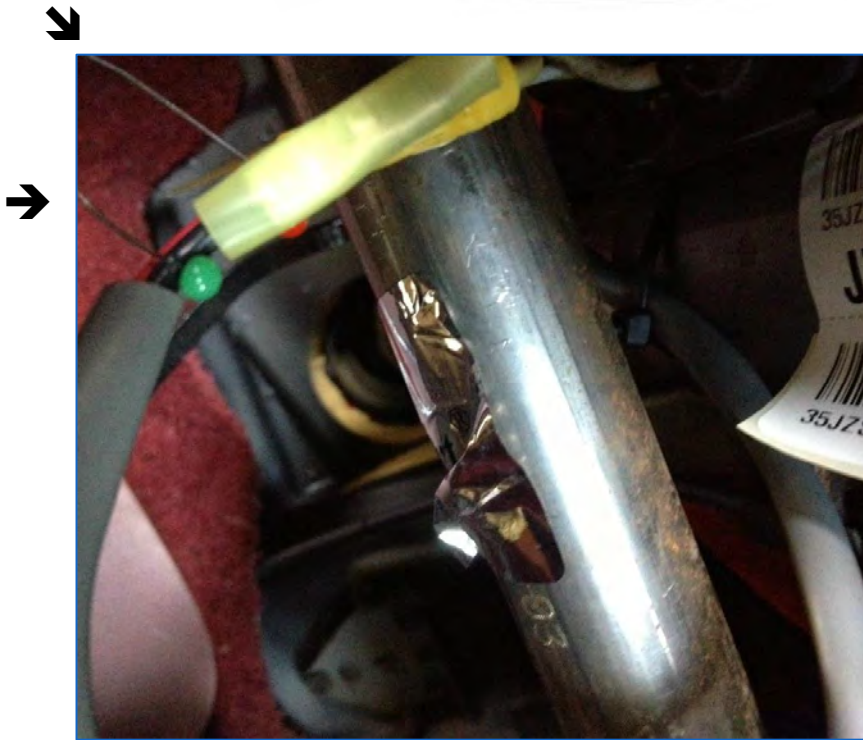
Circumvention Investigations



Circumvention Investigations



Circumvention Investigations



- Tamperproof seal removed
- Sewing pins inserted through the ground and hot wires
- When pressed together the circuit was closed and the vehicle was able to start without a breath sample

Field Testing

- The purpose of a field test is to confirm that devices respond to events in accordance with administrative rule or statute
 - Warm up time
 - Breath volume
 - Etc.
- To test for possible interference issues
 - Mouthwash
 - Hand sanitizer
 - Non-human air samples
 - Etc.



Violation for Driving a Vehicle without Ignition Interlock

- Misdemeanor **Minn. Stat. § 171.09, subd. 1(g).**
- “drive, operate, or be in physical control of any motor vehicle that is not equipped with a functioning ignition interlock device.”

The ignition interlock restriction is denoted on the back of the drivers license



Employment Variance

- Allows a person to drive a company owned vehicle during employment without ignition interlock
 - Not self employed
 - Not a rental car
- Employer will work with Driver and Vehicle Services to obtain variance



Minn. Stat. § 171.306, subd. 4(b).



Education

Education for:

- Law Enforcement
- Probation
- Courts
- Legislators
- Media
- [How Ignition Interlock Works](#)
- [Law Enforcement Roll Call](#)







Questions?

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