



## Slide 1

## Slide 2

Class goal is to present the basics of: Licensing procedures, Test procedures, the Rules and regulations NRS 445B.700 – 845, NAC 445B.400 – 735, and the Nevada Register

We will also make recommendations on customer service and on safety

Your goal is to learn the Licensing procedures, test procedures, and rules and regulations!

Then be able to take and pass the written exam and understand what you need from an outside training, then pass the practical exam after, if necessary, that's a hands on test.

We will be talking about what the inspectors and owners are responsible for.

We will examine, in some detail, the proper procedures to conduct an Diesel Emission inspection.

Please Note, this class is open to any and all relevant questions and discussion.

Also there is ample room for all notes, things you want to remember and such, so use it, it is yours to keep and you will be using it in the written examination.

**No** other notes or materials not provided in this class may be used during the written examination.

## Slide 3

The regulations for vehicle emission inspection that we will be discussing today are found in the NRS, NAC, and Nevada Register.

So what are these anyway?

The Nevada Revised Statutes, (NRS), are the current codified laws of the State of Nevada and are a compilation of all legislation passed by the Nevada Legislature. These are the law.

The Nevada Administrative Code, (NAC), is the codified, administrative regulations of the Executive Branch, which is the details of how to accomplish the requirements of the NRS. These carry the force of law.

The Nevada Register is a compilation of proposed, adopted, emergency and temporary administrative regulations. In these you will find adopted regulations that have not yet been published into the NAC but are in force and also carry the force of law.

**NRS & NAC and the Nevada Register ARE AVAILABLE ON THE WEB**

#### **Slide 4**

There are 2 classes of license in the emission program, and two ratings, they are:

Class 1, (G or D,) Approved Inspector

An inspector who is licensed by the department only to test exhaust emissions.

Ratings are either G for Gasoline or D for Diesel

Class 2G Approved Inspector

An inspector who is licensed by the department to test exhaust emissions and to diagnose, repair and adjust devices for the control of exhaust emissions. Gasoline only.

As there is no 2D, that is we do not license shops or individuals to diagnose, repair and adjust devices for the control of exhaust emissions on diesel powered vehicles, a license that is for Diesel only will be simply a “D” license. The Diesel program is the focus of this class.

#### **Slide 5**

So how do you get licensed?

All licensing of Inspectors is handled through the Emission Lab in your area.

Attend a rules and regulations class conducted by the Department, that is this one, and pass the written examination, with a score of 80% or higher.

Next, if necessary, either become proficient in the inspection equipment operation and maintenance and demonstrate this to the Emission section with a score of 80% or higher at the time of the practical, and that is our recommendation since you will be more familiar with the inspection equipment and it’s operation, or you may obtain certification of competence on the inspection equipment from the manufacturer; the manufacturer may charge for this.

Then, if necessary, pass the Practical Demonstration Examination without error.

The practical demonstration is actually performing an emission inspections in the field. We expect you to be able to do this without error..

All you need to know, the steps and questions involved, are in the training materials, so you know exactly what is expected of you.

If you fail either the practical or written examinations for the first time you must wait 7 days before a second attempt.

If you fail for a second consecutive attempt or more, you must submit proof to the Department that you have successfully completed additional training that is approved or conducted by the Department.

### **Slide 6**

To change a place of employment or add an additional place of employment:

First have a new certificate of employment completed by the new employer and submit it in person to the local Emission lab along with the appropriate photographs.

Then follow the instructions given to you by the DMV Emission Technician at that time.

A D license must be renewed every two (2) years.

You may attempt renewal 90 days before the license expires.

To renew a D license, first complete the rules and regulations course conducted by the DMV, then take and pass the written examination with a score of 80% or higher

Then follow the instructions given to you by the DMV Emission Technician

Initial license is \$25.00 Biennial renewal license is \$25.00

Dual license is \$10.00 Transfer license is \$10.00

There is no charge to add diesel certification to an existing license.

### **Slide 7**

Station license, Inspectors licenses must be placed at a height of between 4 and 6 feet in an area frequented by customers

Business hours must be posted in a location frequented by customers, these are 8 AM to 5 PM, Monday through Friday at a minimum, and are considered normal business hours for the station and must be adhered to.

For a station operated by a single person, a notification indicating at what time the employee will return must be posted at the test station for any instance of business closure. Employ, full time, at least one "D" licensed Inspector  
Must inspect all Diesel powered motor vehicles **requiring** an inspection presented at the facility, unless there is a safety issue, remember no pre-testing.

Required information sources:

NAC sections pertaining to Vehicle Emission testing (445B)

Emission Control Application guides or equivalent information sources

Inspection equipment manual, either the one supplied by the manufacturer or the one available from the DMV website

All Certificates of Compliance must be accompanied by a printout of the opacity readings.

### **Slide 8**

Diesel inspectors are expected to:

Understand the maintenance and operation of the inspection equipment.

Understand how to perform a vehicle inspection correctly, completely, and safely

Determine that an emission inspection is required

Inspect any Diesel powered motor vehicle requiring an inspection that is presented at the station

Unless a safety problem is present or exhaust dilution occurs.

Do not pre-test, this is a violation of regulation

Follow the correct procedures, this is regulation

Determine the GVW, 14,000 pounds or less, 14,001 pounds or greater.

Determine the year, make and model of each vehicle

Determine what equipment the state of Nevada requires to be present

Be able to demonstrate the availability and use of any emission information source used at the station or stations, where they are employed

Locate and determine that all required equipment is present and appears functional

Understand NAC 445B.400 – 735 the blue R&R book

Keep yourself educated with past and current emission technology in the diesel industry

15. Notify the lab within ten days if you leave the employ of any station

### **Slide 9**

Our duties include educating inspectors, we do that in several ways.

In class, as we are now,

In the field, once you are licensed, we audit you at your place of employment, and as part of that process we educate inspectors on items we observe as well as new or revised information as necessary.

This is known as Field Remedial Training

We also perform challenge tests.

We also serve as a referee for Smoking vehicles

Refer all customers with smoking vehicle letters to the emission lab

We are also the only place waivers can be issued

We are responsible for testing inspectors, both with the written examination you will take after this class and a practical demonstration exam you must pass in order to become licensed.

### **Slide 10**

Field remedial training

DMV Emission Technicians may openly monitor activities at emission stations Within the first 60 days of receiving a new inspectors license you may have field remedial training, and at any time through out your career as a licensed emission inspector you may have random field remedial training.

That means a DMV Emission Technician will observe you doing emission testing on customer vehicles at your place of employment and any problems that are noted will be reviewed with the inspector as well as the manager or owner.

A performance report will document any problems that were noted during the emission test.

The performance report will be signed and dated by the inspector and the DMV Emission Technician and it will go in your permanent inspector file.

Be aware that while we are there, if we note any violation or potential violation of State or Federal laws or regulations, it may trigger an undercover run or Covert.

There are 3 Heavy Duty Diesel teams in the state, 1 in the Reno area and two in the Las Vegas area.

They inspect Heavy duty diesel vehicles at roadside test areas and also perform On road enforcement. That is they observe heavy duty vehicles actually on the roads and stop and inspect those that appear to be emitting excessive smoke.

Their visual observations are very accurate but the actual test is done by machine and is a snap throttle test.

We also conduct inspections at dealer locations to verify compliance with the emission regulations and other regulations pertaining to dealer sales

### **Slide 11**

Once a month, at a minimum, an overt audit (meaning open, you know they are there), will be performed by a DMV Emission Technician.

All Emission Stations must have the following on display: Station, Business, and Inspector(s) licenses, outdoor metal emission sign , Indoor information placard, a copy of the pertinent sections of NRS and NAC (the blue rules & regulations book), The inspection equipment operators manual, a current emission control systems application manual (must be accessible for use by the approved inspectors),

And All licensed technicians employed by the station must be able to demonstrate the use of all reference material and electronic media. They need to be able to demonstrate the use of any reference material be it printed or electronic in nature.

In addition the use of any information service available through the use of a facsimile service to satisfy this requirement, must be used to obtain at least one copy of any sample information, if requested by the DMV Emission Technician.

The DMV Emission Technician will perform an audit of the Inspection equipment.

### **Slide 12**

The Department will conduct covert inspections of all Test stations and the performance of all approved inspectors.

In initiating covert inspections beyond the normal annual requirement, The Department will monitor the rates of failure of motor vehicles at the test station and by an approved inspector, for abnormal rates compared to the averages of all test stations and by all approved inspectors. Also, complaints received against test stations and approved inspectors

And any Violations of Nevada Emission Rules and Regulations, or 40 C.F.R. Part 51 (the Federal Clean Air Act) that may be discovered during prior inspections or audits conducted by the Department

In addition, any data, including on the state electronic data transmission system when the Diesel program goes online relating to a test station or approved inspector that the Department determines is questionable.

For use in a covert inspection, a motor vehicles emission control system will be altered so that an approved inspector, using due care and following the prescribed testing procedures, will be able to readily, visually, identify the emission control system or component that has been tampered with. is missing, or, appears inoperable.

If during a covert inspection a violation of the rules and regulations pertaining to the emission inspection procedures occurs, The Department will issue a preliminary written notice of the violation to the approved inspector who committed the violation, or, if they are no longer present, the preliminary written notice will be given to any other employee of the test station who is present and then a copy will be sent to the approved inspector who committed the violation by certified mail within 5 business days.

We will allow the approved inspector who committed the violation or, if they are not there, the person that we delivered the written notice to, to inspect the motor vehicle used in the inspection before removing it from the test station.

Be certain to read and understand the notice, including the date of the required class

### **Slide 13**

#### **On Covert Audits**

The Department may impose administrative fines or other penalties against an approved inspector for any violation of NAC 445B.580, 5805 or 589 during a covert audit, for violations occurring within a 2-year period according to the following schedule:

First offense issue a cease and desist order, and require the approved inspector to complete successfully an educational course conducted by the Department, not later than the date specified.

Second offense impose a fine of \$250, require the approved inspector to complete successfully an educational course established by the Department and conducted by a provider approved by the Department, not later than the date specified and suspend the license for 10 calendar days.

For a third offense the Department will impose a fine of \$500 and suspend the license of the approved inspector for 90 calendar days.

If there is a fourth offense the license will be permanently revoked.

#### **Slide 14**

For violation not occurring during a covert audit, the Department may impose administrative fines for violations occurring within a 2-year period, according to the following schedule:

First offense, a fine of not less than \$100 or more than \$500.

Second offense, a fine of not less than \$500 or more than \$1,000.

Third offense, a fine of not less than \$1,000 or more than \$1,500.

For a fourth or subsequent offense, a fine of not less than \$1,500 or more than \$2,500.

A cease and desist order issued by the Department is considered a first offense.

If a person fails to pay a fine or comply with any directive imposed pursuant to the provisions of this section, the Director may suspend, revoke or refuse to issue any license obtained pursuant to the provisions of 445B of NRS, unless the person has requested a hearing as per 445B835.

If your license has been suspended or revoked you shall not directly or indirectly engage in any activity related to the control of emissions or emission inspections, and you must wait one year before you may reapply for a license, there is of course, no guarantee that one will be granted.

Additionally civil penalties may be pursued by the Department or an individual customer

## Slide 15

The owner of the test station may be held responsible for any act or omission of an approved inspector or any other employee employed at any test station owned by the owner which is committed while the inspector or other employee is acting within the scope of his employment, and which would constitute a violation of NRS or NAC 445B Administrative fines

The Department will impose fines for violations not during a covert audit, occurring within the 2-year period immediately preceding the most recent offense according to the following schedule:

- (a) For a first offense, a fine of not less than \$100 or more than \$500.
- (b) For a second offense, a fine of not less than \$500 or more than \$1,000.
- (c) For a third offense, a fine of not less than \$1,000 or more than \$1,500.
- (d) For a fourth or subsequent offense, a fine of not less than \$1,500 or more than \$2,500.

For the purposes of paragraphs (b), (c) and (d), a cease and desist order issued by the Department shall be deemed to be a first offense.

For violations on a covert audit, the Department will impose such penalties for violations occurring within a 2-year period, according to the following schedule:

- (a) For a first offense, issue a Written Notice.
- (b) For a second offense, require the owner of the test station or his authorized representative to complete successfully an educational course, which is established and conducted by the Department, not later than the date specified in the notice of the violation.
- (c) For a third offense, impose a fine of \$1,000.
- (d) For a fourth offense, revoke the license of the owner to operate the test station.

An owner of a test station whose license is revoked by the Department pursuant to this section shall not directly or indirectly engage in any activity related to emission control inspections of motor vehicles, if the violation was knowing or willful or involved fraud. But may engage in such activity at a test station other than the test station where the violation occurred, if the violation was not knowing or willful, and did not involve fraud. Additionally civil penalties may be pursued by the Department or an individual customer

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1. All diesel powered vehicles within the applicable year and weight range, including vehicles owned by the State or any political subdivision, are required to be inspected annually for renewal and on initial registration in Nevada, if they are based in these two areas:

In Washoe County the entire area below the 40th degree of north latitude

Areas of registration in Clark County hydrographic basin 212 and a five mile buffer area is also included as well as the entire city limits of Boulder City.


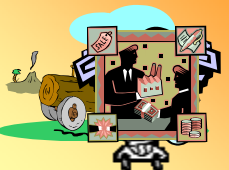
But there are Exempt Areas Within Clark & Washoe County

In Clark County: Goodsprings or any address serviced by a Post Office in Goodsprings.

And in Washoe County: Crystal Bay, Nixon, Wadsworth, Empire, Incline Village, and Sutcliffe or any address serviced by a Post Office in any of these communities.

Please note that in the Reno area, zip codes 89511, 89521 and 89434 in Washoe County will require an inspection. But the same zip codes, 89511, 89521 and 89434 in Storey County Will Not require an inspection.

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<b>Vehicles requiring a test</b>	
	<b>Change of ownership</b> <b>Home built &amp; Specially constructed vehicles</b> <b>Gray market vehicles</b> <b>Engine changes</b>

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## Change of ownership - Private party sales

The buyer is responsible for the emission inspection, not the seller, However, the seller is responsible for all required emission control equipment being present and appearing functional

On dealer sales, a passing VIR is required to be presented to the buyer at the presentation of the DRS, (Dealer Report of Sale), and the dealer is responsible for all required emission equipment being present and appearing functional, regardless of the vehicles age.

This is also enforced by DMV

ASVE (Assembled Vehicle) vehicles are tested by year of engine, the Owner must supply proof of year of the engine. Acceptable documentation includes Engine number breakdown from the manufacturer or published literature. If year of engine can not be determined it will be tested by the year on the registration or title; Gray market vehicles, Engine swaps:

**These must all be verified by the Emission Lab**

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<b>Some Vehicles Are Exempt From Emission Testing</b>	
All over 14,000 pounds GVWR	
All time 4 wheel drive	<b>Motorcycles</b>
Full time 4 wheel drive	<b>Classic Vehicles or Rods</b>
Computerized traction control	<b>90 Days</b>
	<b>Spouses</b>
	<b>24 months</b>
	<b>1967 &amp; older</b>
	<b>Alternate fueled</b>

Exempt vehicles:

All vehicles with a GVW greater than 14,000 pounds, that is 14,001 pounds or more.

All vehicles with all time or full time 4 wheel drive, or computerized traction control that can not be switched off

Motorcycles

Apportioned vehicles, not based in a I/M program area of Nevada

Classic Vehicles or Classic Rods that are presently plated Classic Rod or Vehicle & driven less than 2500 miles in the year since last registration

Transfer of ownership within 90 days of most current passing VIR

Transfer of ownership between spouses

All vehicles that will have been registered for less than 24 months, (that is, two years)

All vehicles with a model year prior to 1968, that is 1967 and earlier are exempt

Hybrid vehicle with a model year five years old or less (exempt for the first five model years)

Alternate fueled vehicles, CNG, Propane, Hydrogen, Etc.

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First things first, is an inspection necessary? Before you conduct the Nevada I/M emission test you must:

Ask: why the vehicle owner wants an emission test, it must be for registration purposes only. Did they just purchase the vehicle? From dealer or private party? Ask in what County, City & ZIP code the vehicle is located. Has it been tested in the last 90 days  
Verify that the vehicle is properly warmed up. How far has it been driven? At least a few miles or 15 minutes is reasonable, as long as it does not sit and cool down before a test, if you are not sure, remember it is your responsibility to see that it is at normal operating temperature.

So whose responsibility is it to make sure the vehicle requires an emissions test?

The inspector's, Your's.

A customer who's vehicle did not require an emission test, but was tested anyway, or was failed incorrectly due to being cold, will be entitled to a complete refund for all certificate fees & labor fees that may have been charged. (NAC 445B.586)

If the vehicle requires an emission inspection and the customer requests an inspection the vehicle must be tested as received, no pre-testing.

Remember only vehicles based in Clark & Washoe Counties require an emissions test for Nevada registration.

## **Slide 20**

The Under hood Emission label provides information in four areas using diagrams, codes, acronyms, and written information.

Area 1 is Engine Family Code and has twelve alpha/numeric characters. The family code has gone through three periods of distinct formatting. They are 1981-1993, 1994-1997, and 1998-present. An explanation of this is in the handout.

Area 2 is The Certification Statement and will indicate the model year of the vehicle.

It will also indicate where this engine is certified to operate. It either conforms to EPA (Federal) and/or California specifications, (49 state or California)

If the label appears altered in any way check model year against VIN and any reference book that you have, if you are still not sure, send it to the Emission Lab

Area 3 is the Catalyst Statement here is where the manufacturer is required by the federal government to indicate whether the vehicle has a catalyst or is non-catalyst. Some manufacturers will also list additional emission devices in this section.

Area 4 is the vacuum hose routing diagram which will show any emission devices that are vacuum operated.

### **Canadian Vehicles & Gray Market Vehicles**

Some Canadian vehicles can be brought into and registered in the United States.

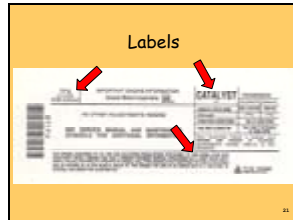
The door post sticker or emission label should tell you if the vehicle is legal for use in the United States. The emission label can be in English, French or both.

The information for Canadian vehicles can be found in the Emission label, Some books, and some CD ROM system.

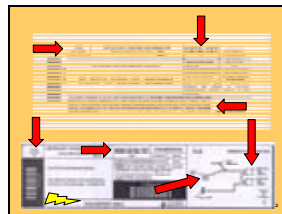
A foreign or gray market vehicle is a vehicle that is manufactured for sale in a country other than the United States, it may not meet US safety standards and must be approved by US Customs and the Environmental Protection Agency before being allowed to enter the country.

These must be sent to the Emission Lab for verification

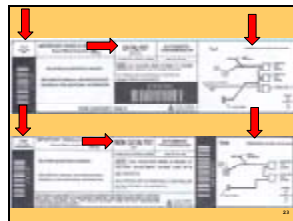
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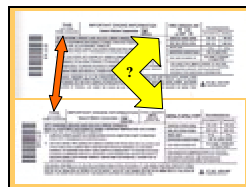
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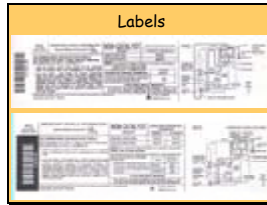
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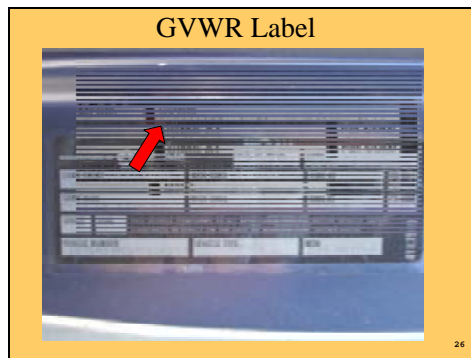
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This can normally be found on the drivers door post.

Remember when you read a Gross Vehicle Weight Rating sticker do not use the Gross Axle Weight Rating!

Using the Gross Axle Weight Rating may cause the vehicle to be tested at an incorrect standard.

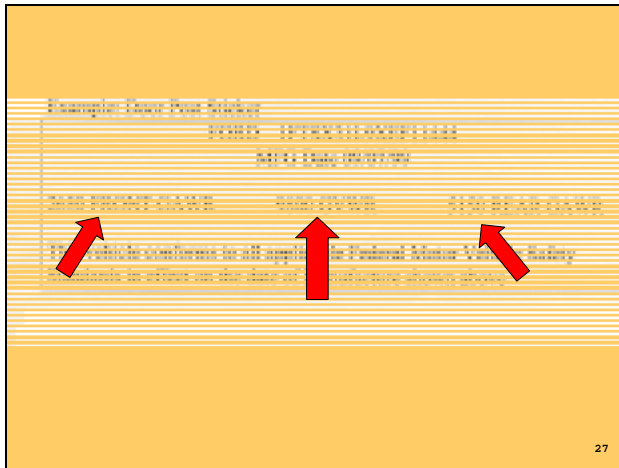
An example would be a Ford F350 that fails an emission test and the GVWR on the VIR is 2650 lbs. Was this a correct GVWR or was this a GAWR?

Be sure to use “ POUNDS” not KILOGRAMS !!

Shows date of manufacture and other information.

If there is no GVWR you will need to call the Emission Lab in your area

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The form is titled "Nevada Department of Motor Vehicles Compliance Enforcement Division Engine Configuration/Vehicle Emission Control Information Form". It contains several sections for data entry:

- County:** [ ] **Technician:** [ ]
- Select Vehicle Type:** [ ] **Note:** Assembled Vehicle - Test by Engine Year; Engine Swap - Test by Vehicle Year; Emission Control Label - Test by Vehicle Year. **Date:** [ ]
- Test Vehicle as:**
  - VW:** [ ] **Engine Year:** [ ] **Vehicle Year:** [ ] **Make:** [ ] **Cylinders:** [ ]
  - Engine:** **Serial #:** [ ] **Make:** [ ] **Model:** [ ] **Displacement:** [ ]
- Vehicle Registered as:** **Year:** [ ] **Make:** [ ] **Model:** [ ]
- Test Vehicle for the following checked items:**

1991 - 1995 LDG Model Year Vehicle; 1996 or newer HDG Model Year Vehicle	1996 and newer Model Year Vehicles	Light Duty Diesel
Air Inlet: [ ]	DLC: [ ]	Catalyst LDO: [ ]
Catalyst: [ ]	ML: [ ]	BSR System: [ ]
BSR: [ ]		Grasscutter Vent Spots: [ ]
Fuel Inlet Restrict: [ ]		Fuel Cap LDO: [ ]
Fuel Cap: [ ]		Mpg Advt Rated HP: [ ]
		Dynamometer Speed: [ ]
		Dynamometer HP: [ ]

The number '28' is visible in the bottom right corner.

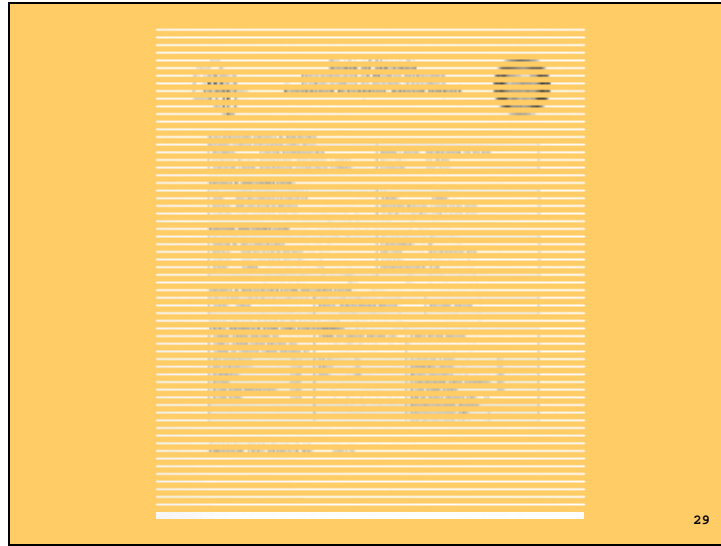
This is an example of an engine swap form. When a customer requests an emission test and presents you with this form, you must inspect the vehicle using the information found on this form, regardless of the emission label or an application guide.

If you have any questions on testing one of these vehicles, contact your local State of Nevada Emission Lab.

You may see this form with ASVE, Engine swaps, supplement engine labels, salvaged vehicles, gray market vehicle, Etc.

This is being phased out and will eventually be replaced by the following:

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This is an example of an Emissions Exemption Vehicle Form.

This takes the place of the engine swap form.

If you have any questions on testing one of these vehicles, contact your local State of Nevada Emission Lab.

You may see this form with ASVE, Engine swaps, supplement engine labels, salvaged vehicles, gray market vehicle, Etc.

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**Before beginning the Emission Inspection portion of the test be aware of the following items:**

- The vehicle MUST be tested in the condition it was received.**
- Conduct the test with ALL accessories turned off and with the wheels properly chocked.**
- Keep the engine running at NORMAL OPERATING TEMPERATURE (use the temperature gauge reading or a touch test on the radiator hose AND visual observation for overheating).**

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Diesel testing:

1968 to current light duty diesel powered vehicles

## **Properly Chock the Wheels!**

### **Turn off all accessories.**

We recommend that you do not use throttle rods! (Due to safety)

We recommend that you sit in the vehicle and operate the throttle from there.

### **The vehicle must be tested as received. No exceptions!**

### **Verify that the engine is at normal operating temperature.**

## **Slide 31**

These are lists of known problem vehicles and known testability issues. They are not intended to be complete listings of problem vehicles, simply a list of those that we are aware of.

It is intended as an aid to you in performing inspections.

These can also be found at these websites, California BAR, Weber state, Colorado state, and probably others.

## **Slide 32**

Tampering Defined: Rendering Inoperative, Intentional Mis-adjustment, of any motor vehicle device or element of design intended to control exhaust emissions.

NAC445B.452

So what does that mean?

Really all it means is that all components that are inspected in our program, that were required to be installed on that particular vehicle configuration, make, model, year, are present and appear to be functional. Remember if all the pieces are not there, or are disconnected or hooked up wrong, worn out, it can not appear functional can it?

On 1968 through 1980 vehicles the only equipment we visually inspect for is fuel caps.

On 1981 through to current light duty Diesel vehicles in addition to the fuel caps we inspect visually for: Crankcase Vent Systems, EGR systems, and catalytic converters.

## **Slide 33**

Application Guides and repair manuals are available in various media

Paper bound books

CD rom disks

Online services

Fax services

Motor Reference Guide or Alldata 1-800-332-1306 or 702-254-8561

Alldata 1-800-697-2533

Mitchell On Demand 1-800-933-2039

Snap-On Shop Key Contact Your Local Dealer

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### EGR System

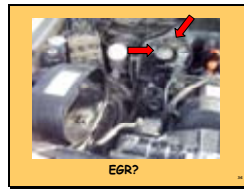
With the EGR system we are again looking to see if the vehicle is required to have it and does it appear functional.

That means, just as before, you are required to use whatever information sources are necessary to determine the requirement and configuration for the vehicles EGR system, that is what type, and also what additional components are connected to the system because again, you will be certifying that the system appears functional and it cannot appear functional if any component that is supposed to be there is missing, damaged or disconnected.

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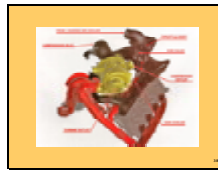
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**Slide 38**



**Slide 39**



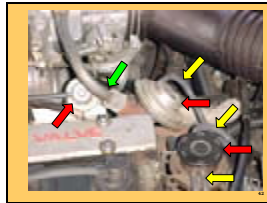
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What can you see in this picture?

Yes it is a gasoline engine but similarities exist.

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HC emissions are reduced with noble-metal catalytic converters in the exhaust system. A portion of the HCs are burned using the oxygen in the exhaust stream. The catalytic converters used in gasoline applications, to control NO<sub>x</sub> emissions need a stoichiometric or oxygen deficient mixture, however, since diesel engines can only be run on an excess air condition a conventional reduction catalytic converter will not work on a diesel engine application.

With the Catalysts we are again looking to see if the vehicle is required to have it and does it appear functional.

That means, just as before, you are required to use whatever information sources may be necessary to determine the requirement and configuration for the vehicles CATs, how many? As always, you will be certifying that the system appears functional and it cannot appear functional if any component that is supposed to be there is missing, damaged or disconnected.

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Most CATS have a heat shield, but not all are visible, some are integrated into the vehicles body.

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The fuel cap is also part of the inspection. You really don't need to look this up, most application guides do not list it since all vehicles came with them.

You must check fuel caps for proper application and seal. If it appears that it will not seal, like it has a cracked or missing seal, or that it is incorrect for the vehicle, such as a screw on cap on a fill pipe that requires a cap with tabs it must be failed. You must check all fuel caps on every vehicle during a test, dual or additional tanks.

That is if they are connected to the vehicle fuel system. Generator fuel tanks or supply tanks for construction equipment are not a part of this inspection. Although these should also be capped, you cannot fail a vehicle if these are not there.

**Slide 46**

Remember, the only time you may write on a VIR is to sign off on a fuel cap failure.

Once you have verified that the fuel cap has been replaced with a correct, properly sealing cap you will then write your license number, the date and sign your name directly above the fuel cap failure.

If a motor vehicle subject to the provisions of this section passes all portions of an inspection but has an improper fuel cap or no fuel cap, the owner or operator of the motor vehicle shall obtain a fuel cap which is in accordance with the specifications of the manufacturer of the vehicle. The inspector shall inspect the new fuel cap and certify its presence in a manner prescribed by the Department, and sign and date the failing vehicle inspection report beneath the fuel cap tamper description. Such a vehicle inspection report may be used as evidence of compliance.

You do not have to be the station or the inspector that failed the vehicle to sign off on the fuel cap.

Any licensed inspector can sign off on the fuel cap once it has been repaired.

Do you charge for this? No.

First, it is not an emission inspection and you may only charge if you do an emission inspection.

Second, and maybe more important, it will only take you seconds to do this and since in many cases this customer did not have his inspection done by you, it is real good customer service. The next time this customer, the one you helped for free, needs any service that you can perform, where do you think they will go?

Right, back to the place that helped them when they needed it and treated them right!

### Slide 47



### Slide 48

**DIESEL TESTING PROCEDURES**

1. Power up the Dynamometer and calibrate as per the equipment manufacturers instructions
2. Power up the Opacity Meter and calibrate as per the equipment manufacturers instructions
3. Determine the vehicles GVWR
4. Check the vehicles engine oil level, coolant level, automatic transmission fluid level (if applicable)
5. Check the vehicles tires for proper air pressure and condition
6. If any item above is not acceptable, do not proceed

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**NAC 445B.589 Testing of light-duty motor vehicles powered by diesel engines:  
Procedure; certificate of compliance; effect of failure. (NRS 445B.785)**

1. An inspector shall comply with the following procedure when testing a light-duty motor vehicle powered by a diesel engine:

(a) The test procedure must include, without limitation, a preparation phase, a tampering inspection phase and an opacity test phase.

**Slide 49**

**DIESEL TESTING PROCEDURES**

7. Position the vehicle on the dynamometer as per the equipment manufacturers instructions
8. After the vehicle is properly positioned, tie it down according to the equipment manufacturers instructions
9. Position wheel chocks in front of the wheels that are not on the dynamometer

49

(b) In the preparation phase:

(1) The vehicle must be placed on a dynamometer, the transmission must be placed in neutral and the vehicle must be properly restrained to prevent any rolling motion.

## Slide 50

10. You may, if desired, Place a cooling fan approximately one foot in front of the radiator

11. Attach the smoke opacity meter according to the equipment manufacturers instructions

12. If the vehicle has dual exhaust, the opacity meter must be attached to the exhaust pipe displaying the highest observed opacity

13. If an exhaust venting system is used, the opacity meter must be attached so that all the exhaust from the test pipe is passed through it

14. Complete the tampering inspection

15. Verify the vehicle is at operating temperature, if it is not it must be operated until it reaches normal operating temperature

50

(3) The inspector shall then affix a smoke opacity meter which has been calibrated and zeroed to the exhaust system of the vehicle according to the recommendations of the manufacturer of the meter. Vehicles with dual exhaust configurations must have the smoke opacity meter attached to the exhaust pipe displaying the highest observed opacity.

(4) If an exhaust removal system is used, it must be installed so that all of the exhaust from the vehicle being tested is passed through the smoke opacity meter.

(c) In the tampering inspection phase, the inspector shall visually inspect:

(1) All vehicles with a model year of 1981 or newer to ensure that all equipment for emission control which is listed on the manufacturer's emission label is present and appears to be operational; and

(2) All vehicles to verify the presence of a properly installed fuel cap.

(d) During the opacity test phase, the inspector shall:

(1) Verify that the vehicle is at normal operating temperature before beginning the test. If the vehicle has cooled down below its normal operating temperature during its placement on the dynamometer, it must be operated until its normal operating temperature is reached.

## Slide 51

16. Test vehicles according to the chart

	SPEED	LOAD
Number of Cylinders	(+ or - 4 Miles per hour)	(+ or - 1 Horsepower)
4	40	7.0
6	40	15.0
8	40	30.0

51

(2) Test vehicles with varying engine sizes under the these speed and load conditions:

## Slide 52

17. Maintain the designated speed and load conditions for 10 seconds.
  18. Store and print the results
  19. Issue a certificate of compliance indicating the results of the test.
  20. A printout from the opacity meter must be provided with the certificate of compliance
  21. The test is complete, and the vehicle passes, if the vehicle passes both the tampering inspection and the opacity test
  22. A vehicle which fails either the opacity standards or the tampering inspection must be considered as failing the inspection
  23. A vehicle which fails the tampering inspection phase or the opacity test must be repaired and retested
- 52

(3) Maintain the required speed and load condition on the vehicle being tested for 10 seconds. The engine opacity must be stored and printed at the end of the 10-second interval.

2. The inspector shall issue a certificate of compliance indicating the results of the test. The printout from the opacity meter must be provided with the certificate of compliance. The test is complete if the vehicle passes the tampering inspection phase and

the results of the opacity test phase comply with the standards set forth in NAC 445B.576. A vehicle which exceeds the opacity standards or which fails the tampering inspection phase must be considered to have failed the inspection and the inspector shall issue a certificate of compliance reflecting the failure.

3. A vehicle which Fails the tampering inspection phase or the opacity test must be repaired and retested.

### Slide 53

24. The standards for opacity are :

Thirty percent at an elevation of less than 4,000 feet above mean sea level for more than 5 consecutive seconds or for periods aggregating more than 5 minutes in any 1 hour; or

or

Forty percent at an elevation of 4,000 feet or more above sea level for more than 5 consecutive seconds or for periods aggregating more than 5 minutes in any 1 hour.

What altitude is Las Vegas?  
The standard is?

What Altitude is Reno?  
The standard is?


53

### Slide 54



## Slide 55

**DIESEL EMISSION INSPECTIONS**

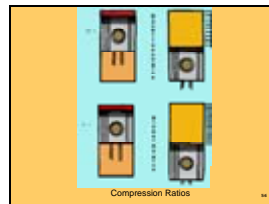


- A diesel engine operates on a different principle than a gasoline spark ignition engine although they appear similar at first look

55

NOTE THAT THERE IS NO IGNITION SYSTEM, HOWEVER THERE IS A GLOW PLUG SYSTEM AND INSTEAD OF A SPARK DISTRIBUTOR THERE IS AN INJECTION PUMP


## Slide 56



Compression ratios are much higher in Diesel engines

## Slide 57

**The Diesel ENGINE**



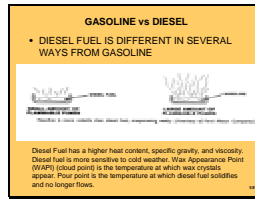
- The Diesel Engine has no throttle plate
- .....
- So how do you control it?
- .....
- How do you shut it off, if there is no ignition system?

57

It takes in as much air as possible but you don't control it by reducing air intake, instead it is controlled by fuel input.

It is shut down by eliminating fuel input.

## Slide 58



The cetane rating is the opposite of the octane rating. The higher the cetane number, the shorter the ignition delay time.

Diesel fuel has an affinity for water so care must be taken to keep the water content to a minimum.

## Slide 59

**CETANE vs. OCTANE**

The diagram shows two inverted cones representing combustion chambers. The top cone is labeled 'OCTANE' and 'FAST BURNING'. The bottom cone is labeled 'DIESEL' and 'SLOW BURNING'. A vertical arrow points upwards from the bottom cone towards the top cone, indicating the transition from slow to fast burning. Below the cones, it says 'The octane scale is the opposite of the cetane scale. (Courtesy of Ford Motor Company)'

- The recommended cetane rating for automotive diesels is approximately 45

The delay between the time the fuel is injected into the cylinder and ignition is expressed as a cetane number. Usually, this is between 30 and 60.

59

Fuels that ignite rapidly have high cetane ratings, while slow-to-ignite fuels have lower cetane ratings.

A fuel with a better ignition quality would help combustion more than a lower cetane fuel during starting and idling conditions when compression temperatures are cooler.

The lower the temperature of the surrounding air, the greater the need for fuel that will ignite rapidly.

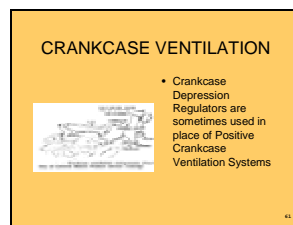
When the cetane number is too low, it may cause difficult starting, engine knock, and puffs of white exhaust smoke, especially during engine warm-up and light load operation.

If these conditions continue, harmful engine deposits will accumulate in the combustion chamber.

### Slide 60

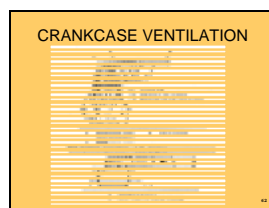
Viscosity of diesel fuel is much more important to diesel operation than it is to a gasoline engines operation

### Slide 61



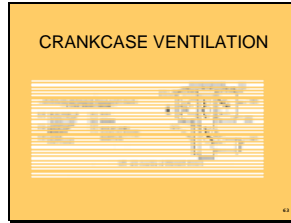
They both perform the same basic task that is to draw blowby gasses out of the crankcase and mixing them with the incoming air. Both systems are designed to maintain a specific pressure in the crankcase, too much pressure can cause oil leaks, too little pressure and oil can be drawn into the engine air intake. REMEMBER, UNLIKE A GASOLINE ENGINE A DIESEL CAN ACTUALLY RUN ON IT'S OWN ENGINE OIL AND SINCE YOU CAN ONLY SHUT IT DOWN BY DEPRIVING IT OF FUEL IF SOMETHING GOES WRONG WITH THIS SYSTEM IT CAN ACTUALLY RUN UNTILL IT RUNS OUT OF MOTOR OIL!!!

### Slide 62



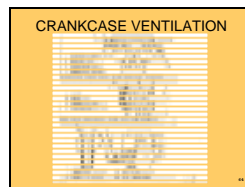
Other crankcase ventilation systems

**Slide 63**



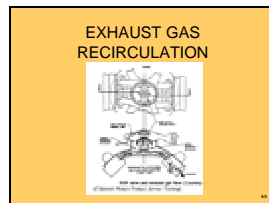
Other crankcase ventilation systems

**Slide 64**



Other crankcase ventilation systems

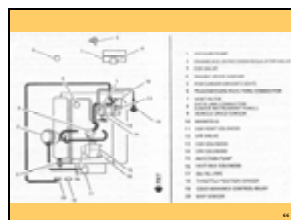
**Slide 65**



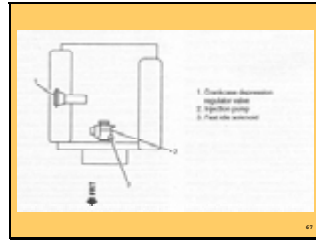
The EGR valve is generally located on the air crossover or intake manifold.

The EGR system is designed to reduce NO<sub>x</sub> (oxides of nitrogen.) emissions.

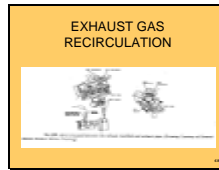
**Slide 66**



**Slide 67**

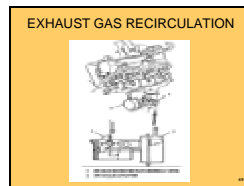


**Slide 68**



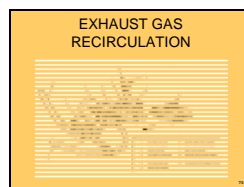
As the name implies, some of the exhaust gases are routed back to, and mixed with, intake air. Diluting the intake air reduces peak combustion temperature, The oxygen content of the exhaust gasses is very low and will not contribute anything to the combustion process.

**Slide 69**



When combustion is started, the temperature rises rapidly, causing the gasses to expand. The spent exhaust gases cannot burn, but the increase in temperature causes them to expand.

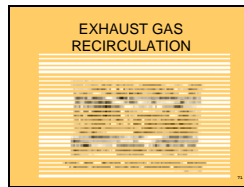
**Slide 70**



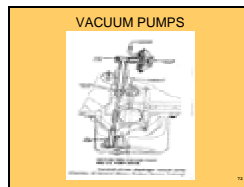
As the spent gases expand, they absorb the heat of combustion, lowering peak combustion temperature. An Exhaust Pressure Regulator (EPR) regulates the amount of exhaust pressure allowed into the EGR system.

Note excessive exhaust recirculation results in excess emissions of soot (black smoke) and CO.

### Slide 71

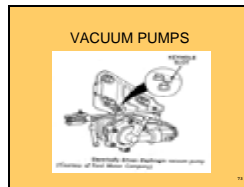


### Slide 72



A diesel engine does not produce much vacuum in the intake manifold since there is no throttle plate

### Slide 73



Vacuum is necessary to drive many control and assist devices as well as some emission systems i.e.. Vacuum assist brakes, EGR valves Etc.


## Slide 74

**Waivers**

**NAC 445B.590**

- **Granted only by the Department**
- **Failures are accompanied with a printout**

How can a Failed test help anyone?



74

What good is a failed test?

It allows issuance of moving permits, It allows a customer to have a challenge test performed on a vehicle that failed opacity at the Emission Lab.

Even vehicles that failed tampering inspection, if the customer is unconvinced.

A Failed test is the beginning of the waiver process as well.

It is not, of no value, to your customer, or you!

A waiver permits the registration of the vehicle.

Only the Department may grant a waiver from the provisions of NAC 445B.576, Standards for emissions.

The Department will deny an application for a waiver if the parts have not been installed or the repairs performed as indicated on the receipts presented to the Department.

The Department will allow registration of the vehicle if The Department finds after inspection, that additional costs exceeding the minimum established in this section are needed to bring the vehicle into compliance.

A minimum of \$750 in repairs, parts and labor, to correct the problem, performed at a repair facility, or \$500 in receipts for installed parts if repairs are performed by the owner.

A vehicle under a warranty covering the affected components is not eligible for a waiver.

No waivers are allowed for smoking vehicles, they must be repaired regardless of the cost.

Repairs to required emission devices and repairs done to systems not directly related to the emission failure will not count toward the minimum expenditures

Waiver applications must be presented by the customer at the local Emission Control Lab and must include; the failing vehicle, all receipts to document the repairs dated within 14 calendar days of the failure,, receipts for the installed parts if it is an owner repair, dated within 14 calendar days of the failure, the failing VIR from before the repairs, the failing VIR from after the repairs.

The issuance of a waiver is not guaranteed and there are no waivers from smoking failures and tamper failures.

### **Slide 75**

Emission Control Lab

702-486-4981

Emission Training Officer

Hal Greene

702-486-4999

[hgreene@dmv.state.nv.us](mailto:hgreene@dmv.state.nv.us)

Smoking vehicle hotline 702-642-7664 (SMOG)

### **Slide 76**

Emission Lab

775-684-3580

Emission Training Officer

Hal Greene

702-486-4999

[hgreene@dmv.state.nv.us](mailto:hgreene@dmv.state.nv.us)

Smoking vehicle hotline 775-686-7664 (SMOG)

## **Slide 77**

DMV's role

Approved Inspectors role

Remember, You are the frontline Representative for Nevada's clean air program. It is vitally important that you are knowledgeable about the emission program, the emission test and results and the emission analyzer. It is especially important if you repair vehicle emission systems, your ability to diagnose and correct problems is crucial to Nevada's efforts to improve its air quality.

## **Slide 78**

First recognize the inherent advantage of having four answer choices right there in front of you, the correct answer is already there and all you have to do is find it!

Have a Positive Attitude: "I can do this!!"

Multiple choice tests

You may not always be given the perfect answer, you must choose the best possible answer.

Eliminate answers you know or can prove wrong.

Read all the answers, even if the you believe you have found the correct answer first.

Read the question and then only one answer, do this for each answer.

Guess if you have to, 25% chance is better than 0%

If you have to guess, eliminate as many wrong answers as possible first

## **Slide 79**

True – False questions

50 – 50 chance if you just guess!

Usually one is opposite of the other.

Probably hinges on one word or phrase.

You just need to prove it wrong, that is easier than proving it right!

Tech A vs. Tech B questions

These look dangerous and complicated, after all there are usually two long statements you have to read through, but really these are almost as simple as True False. OK they are as easy as TWO True false question. That is what they are!

Read Tech A first and realize he is either right or wrong so his statement is either True or false!

Do not read the other techs statement until you decide on Tech A. Then do the same with Tech B's statement, it is either True or false!

The answers will be:

- (a) Tech A only
- (b) Tech B only
- (c) Both Tech A and Tech B.
- (d) Neither tech A nor Tech B

Slide 80

1. There is to be no marking in the test booklets. Each will be checked and any marks found will result in invalidating that applicants examination and they will be required to reschedule and retake the class and test. If your test booklet is marked in, immediately bring it to the instructors attention, so that you will not be penalized.
2. Read all instructions in the test booklet, all provided information is available for reference, this is an open book test.
3. Be sure to look up any item that is possible to look up, NAC, NRS, exhibits, your workbook, Etc.
4. Take your time, don't assume your recollection of the material is correct, some questions are meant only to test your' ability to look things up and determine what means are best to do this. The answers may be identical, except for one or two words.
5. The instructor may not assist you in answering a question, however they may assist you in understanding a question or if the exhibit is not legible, assist with another exhibit book.

Security rules: No cell phones, if you brought one, place it in silent mode on the table in front of you or in your car, you may not make nor accept any calls during the test, this includes text messaging. No camera phones, if you have a camera phone hand it over to the instructor before beginning the test, or put it in your car. If a call comes in that you feel you must accept, turn in your paperwork and reschedule the class and exam.

No looking at another's answers, they are probably worse than yours anyway. If you are observed either looking at another's answers or showing another your answers you will be failed and must reschedule.

No talking during the test, if caught you will be failed and must reschedule.

Scoring: the exam will be scored by the instructor and the pass or fail results will be available on \_\_\_\_\_ at \_\_\_\_\_

Reporting: the exam score is only available to the applicant, no information will be given to a third party unless agreed to, in writing, by the applicant.