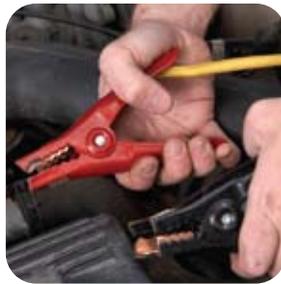




# HANDS-ON CAR-CARE CLINIC

COMPLIMENTS OF HIGHLIFT AUTO SERVICE



BASIC MAINTENANCE • TIRE MAINTENANCE • OIL CHANGES  
BATTERY CHECK • SEASONAL MAINTENANCE • EMERGENCY KIT



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We would like to thank **DRS Auto Supplies** and **Connell Chrysler** for their support with this clinic.

Welcome to **Highlift Auto Service's** Car Care Clinic. During this clinic we would like to educate you on the basics of car care. What you are about to learn may sound simple but is very important if you are going to be driving. We want you, the driver, to feel comfortable and confident doing basic maintenance, anything from topping up the windshield washer fluid to changing a flat tire.

The more you know, the more confident a driver you are.

Please feel free to stop us at anytime to ask questions. Every question is important and brings you one step closer to understanding your car.

## I. BASIC MAINTENANCE



### Car Maintenance

What is it and why is it important?

Car maintenance is preventative and less expensive in the long run. It is seeing a problem and fixing it before rather than after. All vehicle manufactures include in the owner's manual\* a list of maintenance recommended for your specific vehicle. This list includes oil changes, spark plug replacement, general tune-ups, etc. The list may vary depending upon specific driving conditions such as cold weather.



**REMEMBER:** Check for burnt out headlights and brake lights on a regular basis.



### Gauges

What do they mean?

Your vehicle has many different gauges, each mean something different. These gauges are a link to what is happening under the hood.

#### TACHOMETER:

This shows how fast your engine is running (RPM).

#### SPEEDOMETER:

This shows how fast you are travelling. Posted speed limits are for ideal travelling. Remember to always slow down in bad weather. (Fog, heavy rain, snow, ice, etc...)

#### OIL PRESSURE:

This represents the oil supply to your engine. When the oil pressure is too low it could cause engine damage. You should immediately check your oil and call your service technician. High oil pressure is not common. It could mean that you have the wrong type of oil in your vehicle or other problems. Again, you should call your service technician.

#### FUEL GAUGE:

This gauge tells you the fuel level in your tank. When the weather is cold, it is not recommended to let your tank get below half because of condensation problems.

#### ENGINE/COOLANT TEMPERATURE:

This gauge represents your engine temperature. A vehicle that is overheating should be shut off and allowed to cool down. A cold engine will not produce the heat in the winter and is harder on fuel consumption. Normal temperature runs around the center of the gauge.



What should you do if your car overheats?

Shut the vehicle off immediately and contact your service technician.

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### VOLTAGE GAUGE (CHARGING GAUGE):

This gauge represents the electrical system. It shows what your battery power is and what the alternator is producing. On a vehicle that is running the gauge should read 13.0V to 14.7V approximately. If this reads too low or too high you need to contact your service technician.



### Warning lights

What do they mean?

Warning lights are alerting you to a problem. They are not to be ignored. When a new light appears you should first, consult your owner's manual\* then bring your vehicle to a service technician for a diagnostic check.

Below are a few examples of warning lights and what they mean.

#### CHECK ENGINE:

There is a problem with the vehicle's engine electrical system or sensors and should be addressed immediately.

#### FUEL LIGHT:

This light lets you know that your fuel level is getting low.

#### WINDSHIELD WASHER FLUID LIGHT:

This light lets you know that your washer fluid is low.

#### OIL PRESSURE LIGHT:

This light indicates that you are running low on oil. You need to top up your level immediately or engine damage might occur. You should always top up your engine with the recommended oil or call your service technician.

#### CHANGE OIL LIGHT:

This light indicates that an oil change is overdue.

#### SECURITY/ANTI-THEFT LIGHT:

This indicates a problem with your anti-theft system.



### Fluid Levels

Why to check them and their importance.

#### ANTIFREEZE:

Antifreeze should only be checked on a cold engine to prevent burns when the engine is hot. Consult your owner's manual\* for specific levels.

#### WINDSHIELD WASHER FLUID:

In the cold weather you need winter washer fluid, generally -40°C. In the summer you can use a fluid that has a detergent in it to remove bugs. By using the proper fluid you will be ensuring good visibility through your windshield at all times. Never let your fluid run out and carry a spare jug with you at all times.

#### OIL:

Oil should be checked with the engine shut off and sitting on a level surface. Always bring the dipstick out, wipe clean, and then check the level. If you do not, the level will not be accurate.

#### BRAKE FLUID:

A visual check of the reservoir can be done. Consult your owner's manual\* for recommended brake fluid. **ONLY USE APPROVED BRAKE FLUID FOR YOUR BRAKE SYSTEM.**

#### TRANSMISSION FLUID:

An automatic transmission can be checked on most vehicles with the engine running with park brake applied. Consult your owner's manual\* for proper level and to see whether your vehicle needs to be in park or neutral. A manual transmission has to be checked by a service technician with your vehicle on a hoist.



**NOTE:** Fluid levels listed above are checked routinely during oil changes. An oil change is generally recommended every 3 months or every 5000 kilometers, whichever comes first.

**STOP SHOPPING AROUND!**

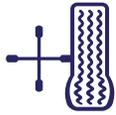
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## 2. TIRE MAINTENANCE



### How to change a flat tire

A flat tire should be changed on a level surface whenever possible and always with the park brake applied. Consult your owner's manual\* for proper procedure and location of spare tire and tools. A demonstration will be provided during the clinic as well as a hands-on opportunity to change a tire.



### How to measure tire pressure

In order to properly measure tire pressure you need a tire pressure gauge. Remove valve stem cover and put tire pressure gauge squarely on the valve stem to provide an air tight seal. The gauge will indicate tire pressure.

#### What is your vehicle's ideal tire pressure?

Most passenger vehicles start at 32psi approximately. For your vehicle's specific tire pressure consult your owner's manual\*. Never exceed recommended pressure indicated on tire.



**WARNING:** Underinflated tires can cause a tire to overheat and blow out.

#### Does the weather make a difference in your ideal tire pressure?

Cold weather condenses air which lowers tire pressure to the point it may be underinflated. Hot weather expands air which increases tire pressure. Tire pressure should be checked monthly and during extreme temperature changes.



### How to put air in your tires

Remove valve stem cover and add air in small increments rechecking tire pressure frequently. There will be a demonstration provided as well as a hands-on opportunity.



### Winter versus all season

What is the difference in tires?

#### WINTER TIRES ARE MADE FOR WINTER

Winter tires contain a softer rubber compound making them grip the ice and snow better in cold weather.

One misunderstanding people have is that winter tires are for snow. The fact is that once the temperature gets below 5C winter tires begin to outshine all-season tires. Winter tires have tread patterns and rubber compounds engineered for cold conditions. With a winter tire you can improve braking by 25% and handling by 38%.

You need 4 winter tires to maintain vehicle handling and balance.

#### ALL SEASONS ARE FOR SPRING, SUMMER, AND FALL

They contain a harder rubber compound making them grip better during the warmer weather. For winter driving in New Brunswick all-season tires aren't the best answer, they are a compromise. When the temperature drops, they get too hard to grip ice and snow.



**REMEMBER:** Retorque your wheels within 100km of a tire change to prevent a loose wheel.

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### 3. OIL CHANGES



#### Why change the oil?

An engine produces contaminants that shorten engine life. Good quality oil contains a detergent that cleans your engine. When you do an oil change you remove the dirty oil and replace it with new oil. This continues to keep your engine clean. Oil changes are also a good way of doing preventative maintenance.

A good service technician will also check fluid levels during an oil change.

### 4. BATTERY CHECK

You rely on your car every day so when it doesn't start, it can be really frustrating. One way of ensuring that your car will start even on the coldest of New Brunswick mornings is to check your battery. The colder the weather the harder it is on your battery.



#### The amps Required to Start Your Car

Looking at your battery you will see there are two numbers on the label. One of the numbers is the CCA (cold cranking amps) and the other number is the CA (cranking amps). The CCA value tells the amount of amps required to start your vehicle at -18°C for 30 seconds and the CA value tells the amount of amps required to start your vehicle at 0°C for 30 seconds.

A good battery for this climate and for the average size car has a CCA value of between 600-800 amps. Some smaller cars can get away with a 400CCA value. The CA value isn't as relevant in a climate that goes below 0°C.

### 5. SEASONAL MAINTENANCE



#### What you should do at the change of seasons

A general tune-up is recommended at the change of seasons. Below is a check list for changing from one season to another.

WINTER TO SUMMER	SUMMER TO WINTER
change windshield wipers	change windshield wipers
change to all season tires	change to winter tires
check all fluid levels	check all fluid levels
change washer fluid	change washer fluid
check a/c	check antifreeze

### 6. EMERGENCY KIT



#### What a good emergency kit includes

##### WINTER KIT:

Snow brush, ice scraper, snow shovel, booster cables, emergency lights, fuel line deicer, lock deicer, extra jug of winter washer fluid, flashlight, blanket, **first aid kit**, emergency food & **water**, and brightly colored "help" sign.

##### SUMMER KIT:

Emergency lights, extra jug of washer fluid, flashlight, blanket, **first aid kit**, emergency food & **water**, and brightly colored "help" sign.

\*If you do not have a copy of your vehicles owner's manual we strongly recommend that you get one. They can be bought from your local dealership.



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## WHAT IS IT???

**ABS:** Abbreviation for Anti-Lock Braking System

**ANTIFREEZE:** Liquid used in a cooling system that is mixed with water and prevents the water from freezing, serves as engine coolant

**ANTI-LOCK BRAKES:** Computer-controlled brakes that will not “lock” and permit wheels to skid

**BALL JOINT:** Holds the lower and upper pivot points of the steering knuckle (where the wheel attaches)

**BELTS:** Fabric made of steel or other material that is placed between body plies and tread

**BELT SQUEAL:** Noise resulting from a slipping drive belt

**BLOCK HEATER:** A heating device used to warm the block of a diesel engine in cold weather

**BOOT:** Flexible pleated covers placed over the CV joints of a front-wheel-drive vehicle to keep road dirt out of them

**BRAKE DRUM:** Attached to the wheel and looks like a drum, the shoe pushes against to stop vehicle

**BRAKE LINES:** Metal tubing and rubber hoses connecting master cylinder to wheel brake assemblies

**BRAKE PADS:** Flat steel plates with a friction material (semi-metallic, organic, or ceramic) adhered or riveted to one side

**BRAKE PEDAL VIBRATION:** Pulsing movement of brake pedal, usually caused by out-of-round brake drum or warped rotor

**BRAKE SHOES:** A half moon steel shoe with friction material (same as material used in brake pad) adhered to it as well

**CALIPER:** A casting containing a hydraulic piston that squeezes the brake pads against the rotor stopping the vehicle

**CAMSHAFT:** Rotating shaft with lobes that open valves at the correct times for proper engine operation

**CAMSHAFT DRIVE:** Gears, a chain and sprockets, or a belt and sprockets that run the camshaft at half the speed of crankshaft rotation

**CENTRE LINK/Drag Link:** Joins the pitman arm and the idler arm with the two inner tie rods

**CLUTCH:** Device that allows the driver to engage or disengage the engine and transmission

**COMPUTER:** Electronic device used to control many systems of modern vehicles

**CONTROL ARM BUSHING:** Sleeve that allows control arm to swing up and down

**CONTROL ARMS:** Movable lever arm that forms part of a vehicle’s suspension system

**DISC BRAKES:** Most commonly found on the front of most vehicles, also on the rear of late model vehicles

**ENGINE FLOODING:** Excess fuel in the intake manifold, prevents starting

**ENGINE SENSORS:** Devices that monitor temperatures, fluid levels, and other engine conditions for computer input

**IDLER ARM:** A steering component used to transmit horizontal movement (back and forth) to the tie rods from the pitman arm by the centre link

**MANUAL TRANSMISSION:** One that is shifted from gear to gear by the vehicle operator

**MANUFACTURER'S / OWNER'S MANUAL:** Service manual produced by an auto maker and restricted to its vehicles

**MASTER CYLINDER:** Hydraulic piston type pump that develops pressure for the braking system

**MUFFLER:** An exhaust-system component that decreases the noise of vehicle operation

**OXYGEN SENSOR:** Device that monitors oxygen content in engine exhaust to correct air-fuel ratio

**PITMAN ARM:** Is connected to the steering box giving you horizontal movement

**RACK AND PINION:** Is a steering assembly that does not use the idler arm, pitman arm, or centre link, it is a long shaft with a gear on it that moves back and forth, when the gear is moving it pushes on the inner and outer tie rods to steer the vehicle

**ROTORS:** A flat disc which the friction material presses against to stop your vehicle, this is attached to the wheel and turns with the wheel

**SHOCKS:** Prevents excessive bounce when hitting bumps

**STRUT ASSEMBLY:** Contains the shock, the spring, and the upper mount/bearing plate all in one, it carries the weight of the vehicle and allows for independent suspension (often this assembly is used on front wheel drive cars)

**TIE ROD (INNER AND OUTER):** A steering component that consists of a ball and socket and a threaded shaft that connects to your wheel

**WHEEL CYLINDER:** Is a small casting that contains a hydraulic piston(s) that pushes the ends of the shoes against the drums thus stopping the vehicle





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