

Carburetor

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The logo of Galgotias University is a stylized 'G' composed of several curved, overlapping bands in shades of yellow, orange, and blue, set against a light pink circular background.

Carburetor

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Fuel System

Carburetor

- A device that mixes air and fuel in correct proportion for efficient combustion.

- Stoichiometric Ratio

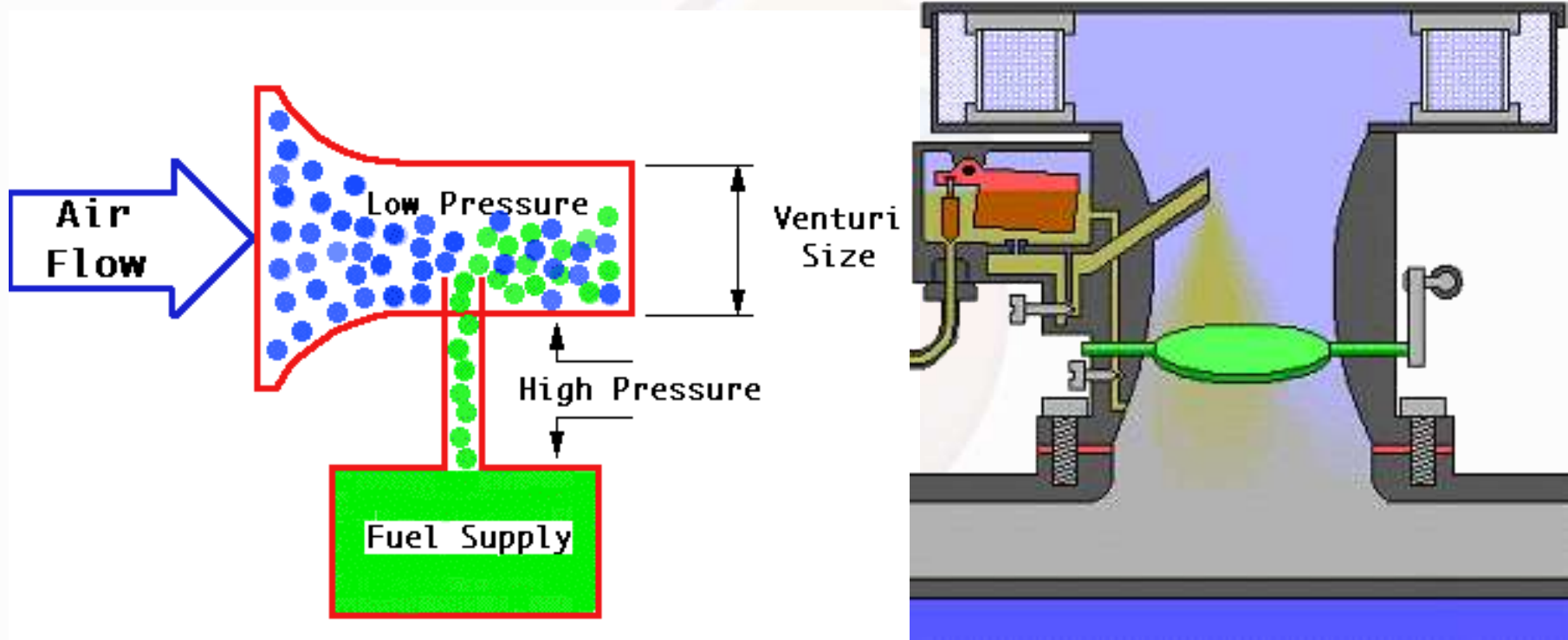
14.7 : 1 (Air : Fuel)

- CFM of air flow: Cubic feet of air per minute



Fuel System

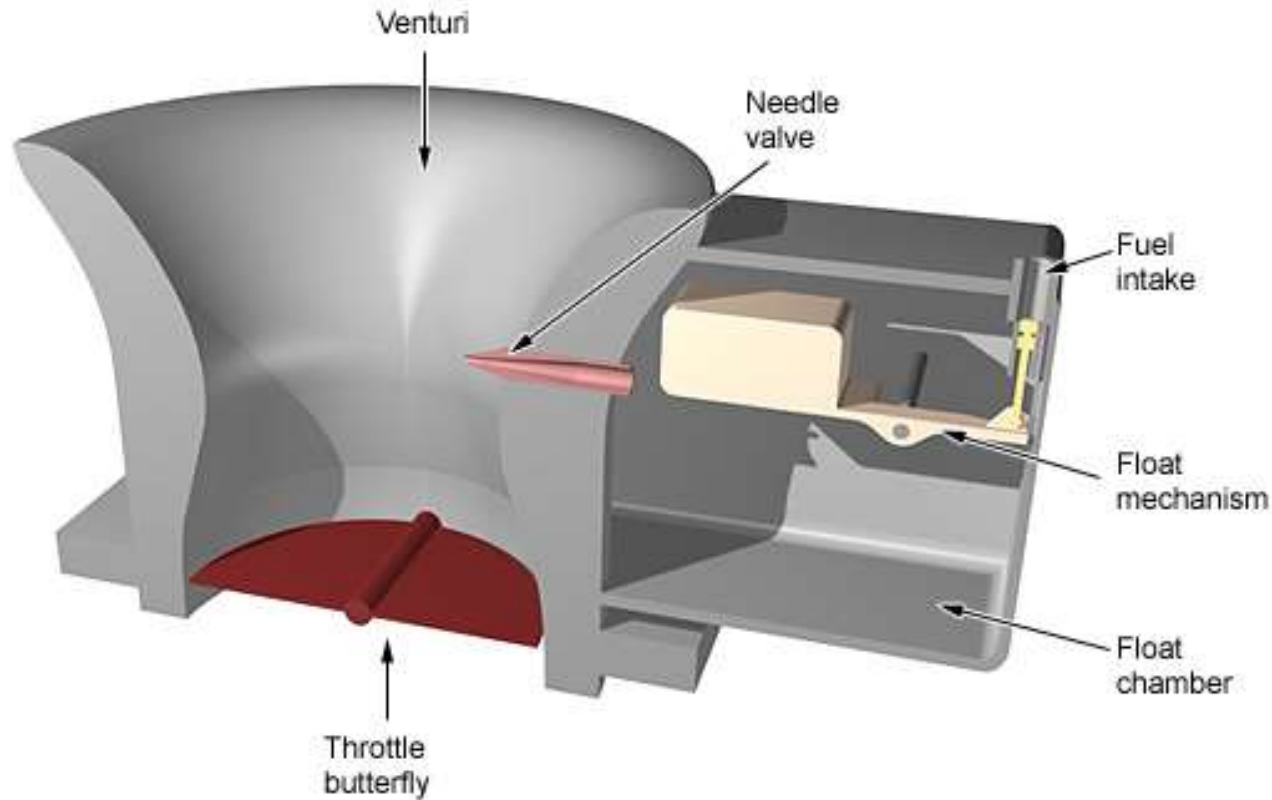
Venturi



- Venturi works on high-low pressure.
- As the air speeds up when passing through the air horn(venturi), it creates vacuum, causing suction to pull fuel from the discharge tube.

Fuel System

Carburetor Parts

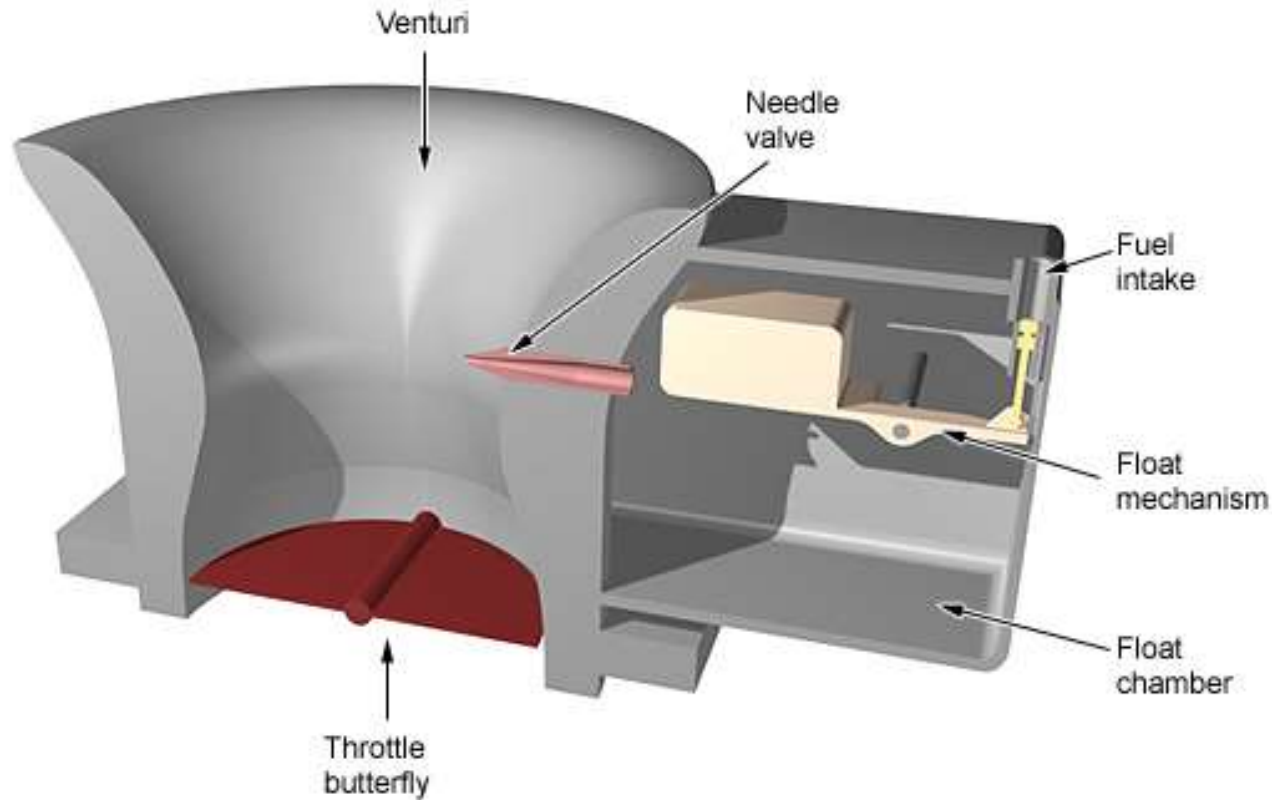


Air horn/throat routs outside air into the engine intake manifold.

Throttle plate is a butterfly valve that restricts air flow through the carb, and this restriction reduces the amount of fuel flowing through the engine.

Fuel System

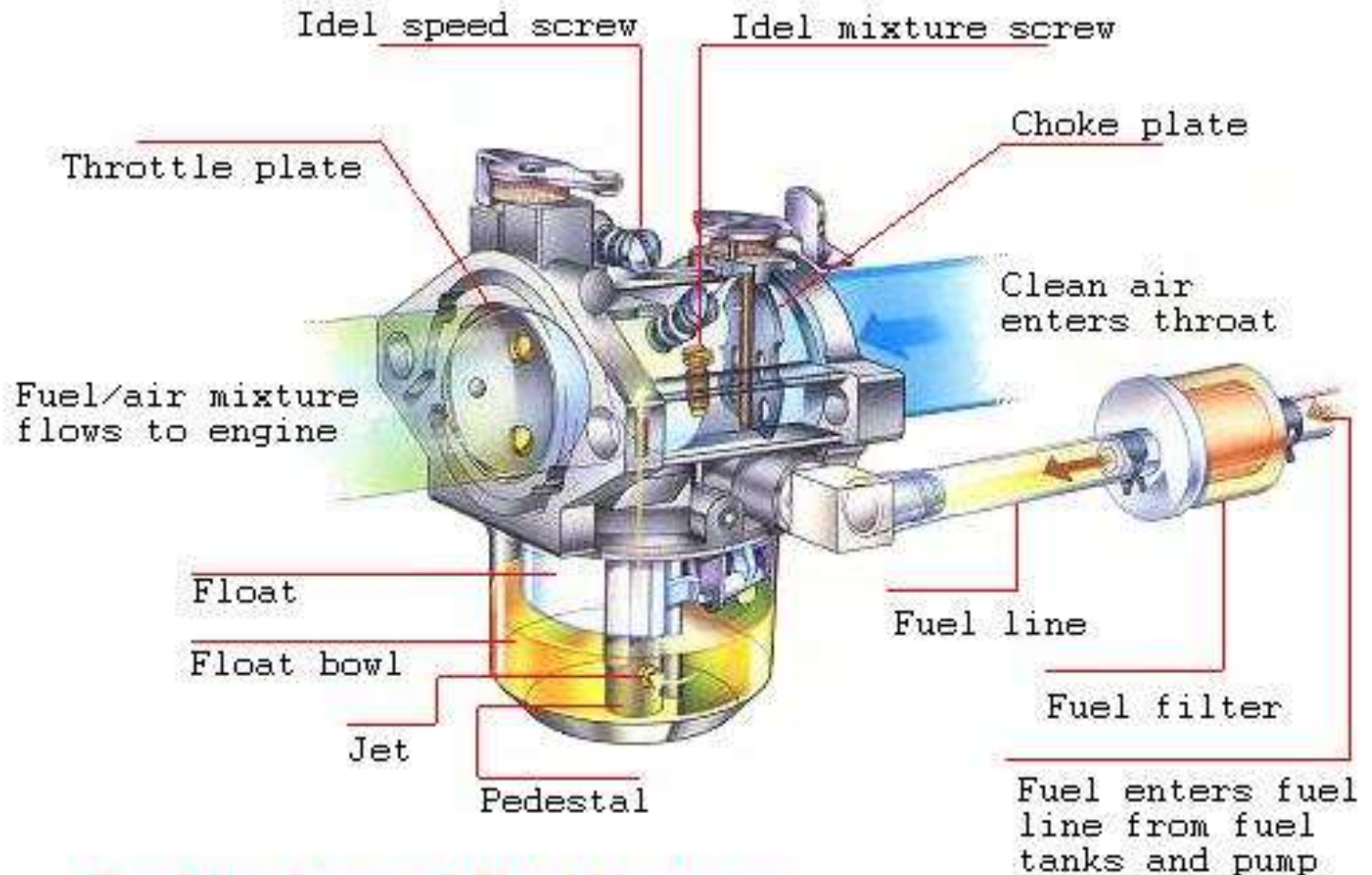
Carburetor Parts



- **Discharge tube** uses venturi to discharge fuel into the air horn.
- **Needle valve (Idle mixture screw)** controls the amount of fuel passing through the discharge tube

Fuel System

Carburetor Parts

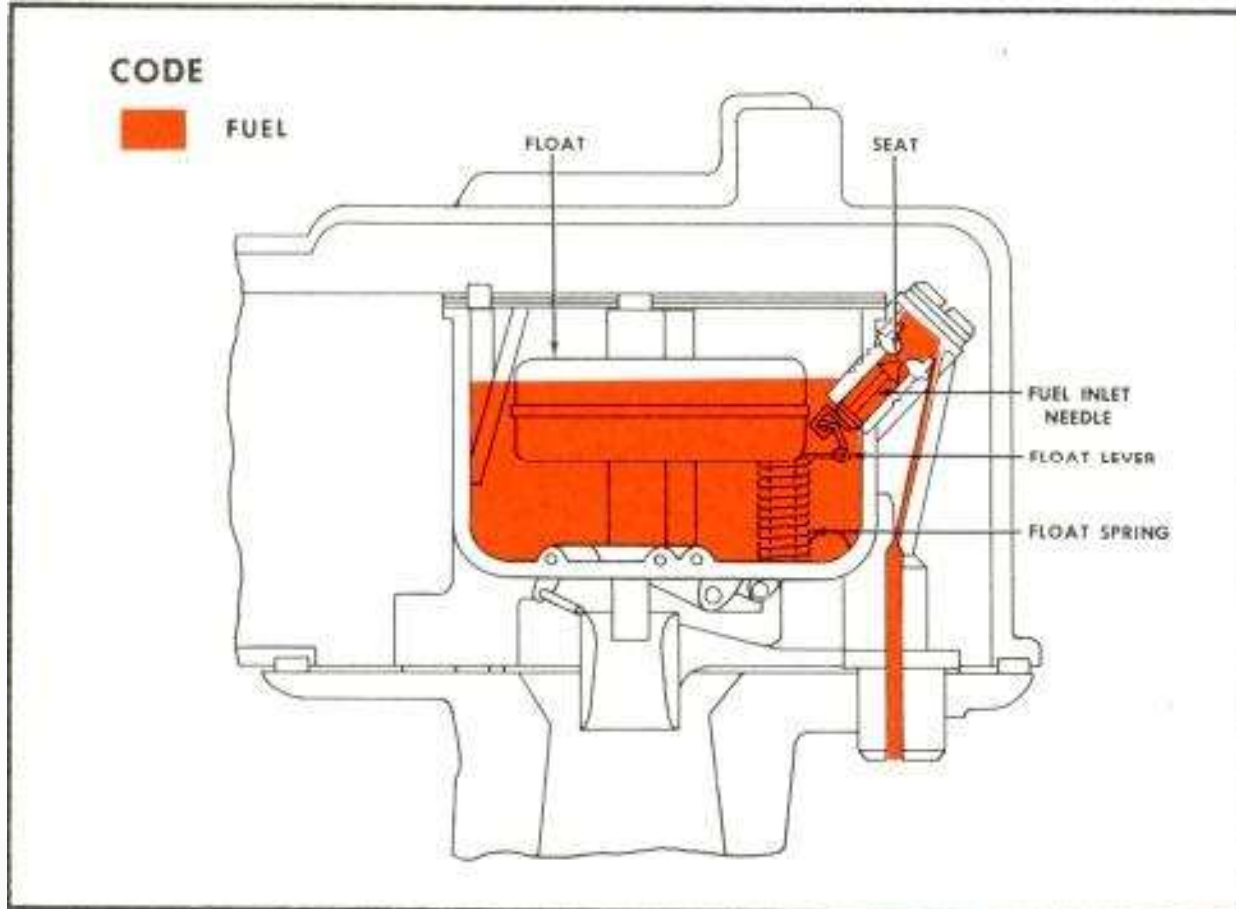


Carburetor and Fuel System

Fuel System

Carburetor Parts

- Idle speed screw sets the engine's idle speed (800 RPM).
- Float rides on top of the fuel in *the bowl* to open and close the needle valve. Maintains the correct level of fuel.



Fuel System

Gasoline engine's air fuel mixture may vary from rich (8:1) to lean (18:1)

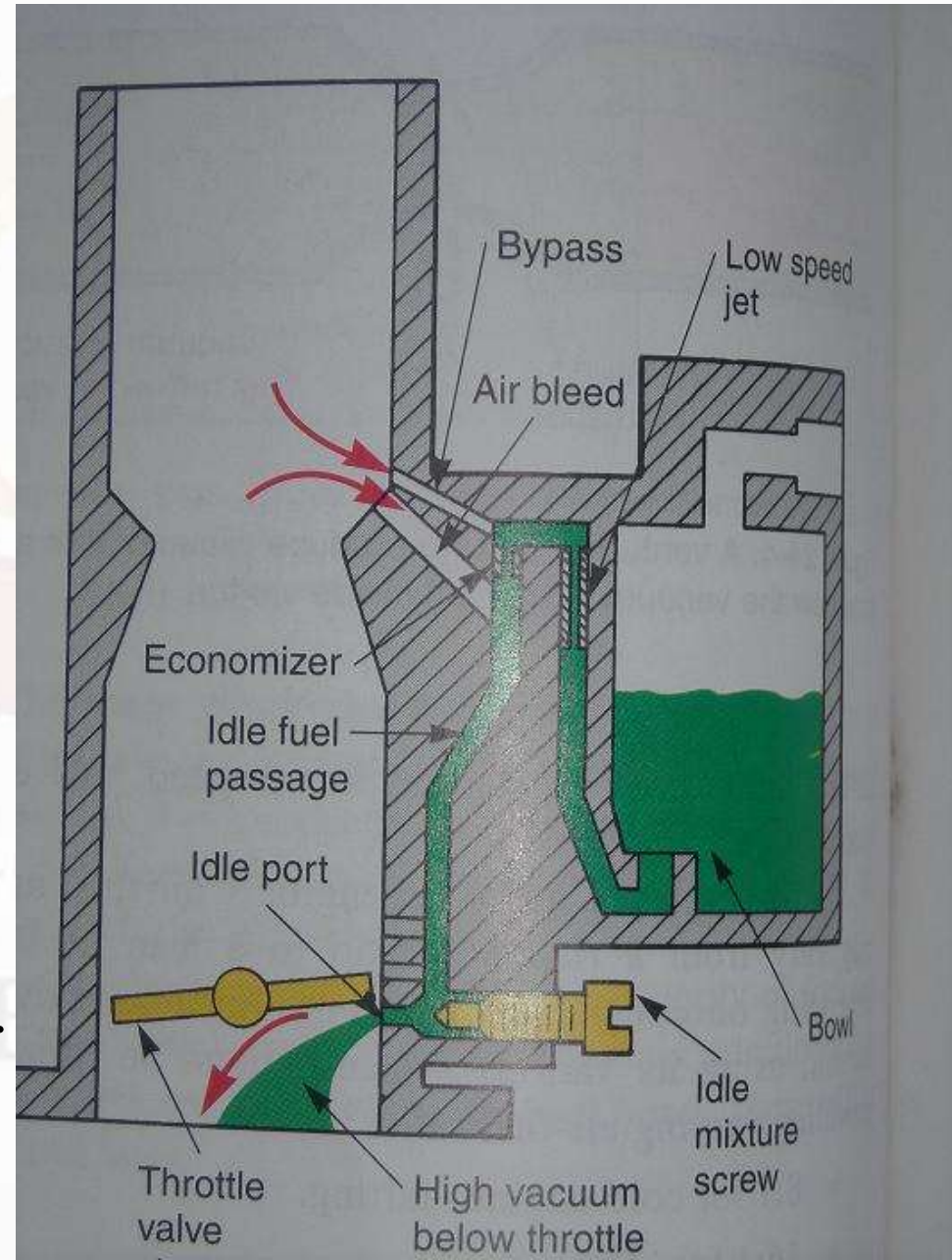
- 8:1 for cold starting.
- 16:1 for idling.
- 15:1 for part throttle.
- 13:1 for full acceleration.
- 18:1 for normal cruising at highway speeds.

An automobile carburetor must be capable of providing varying air fuel ratios.

Fuel System

Idle system

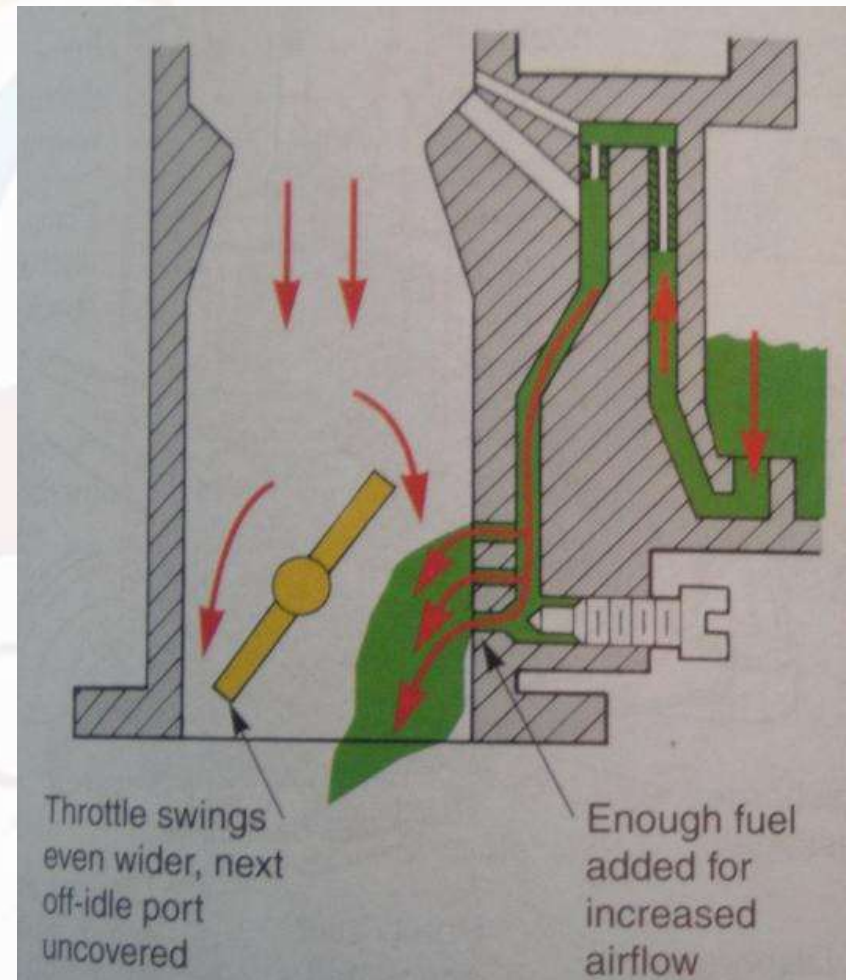
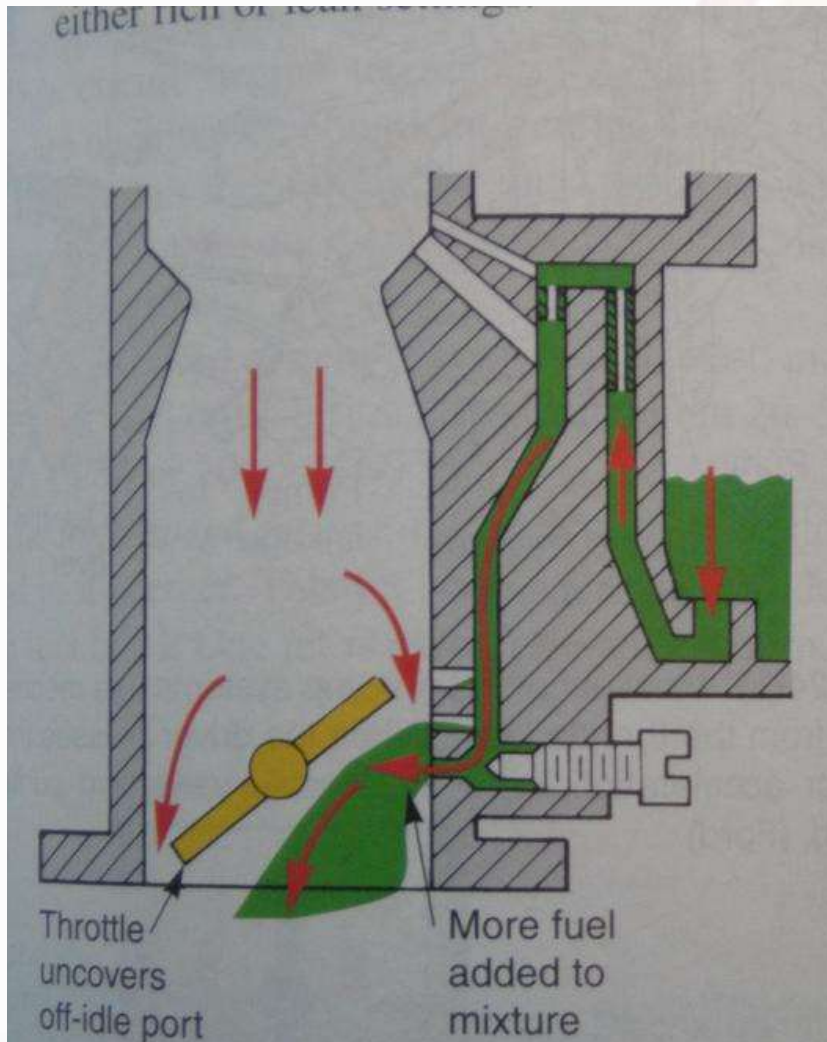
- Feeds fuel into air horn when the throttle is closed (low engine speed).
- High vacuum below the throttle plate pulls fuel from the idle port.
- Idle mixture screw allows adjustment of fuel at idle.
- Air bleed helps premix air and fuel.



Fuel System

Off idle system feeds fuel to the engine when the throttle is opened slightly.

- It adds a little extra fuel to the extra air flowing around throttle valve

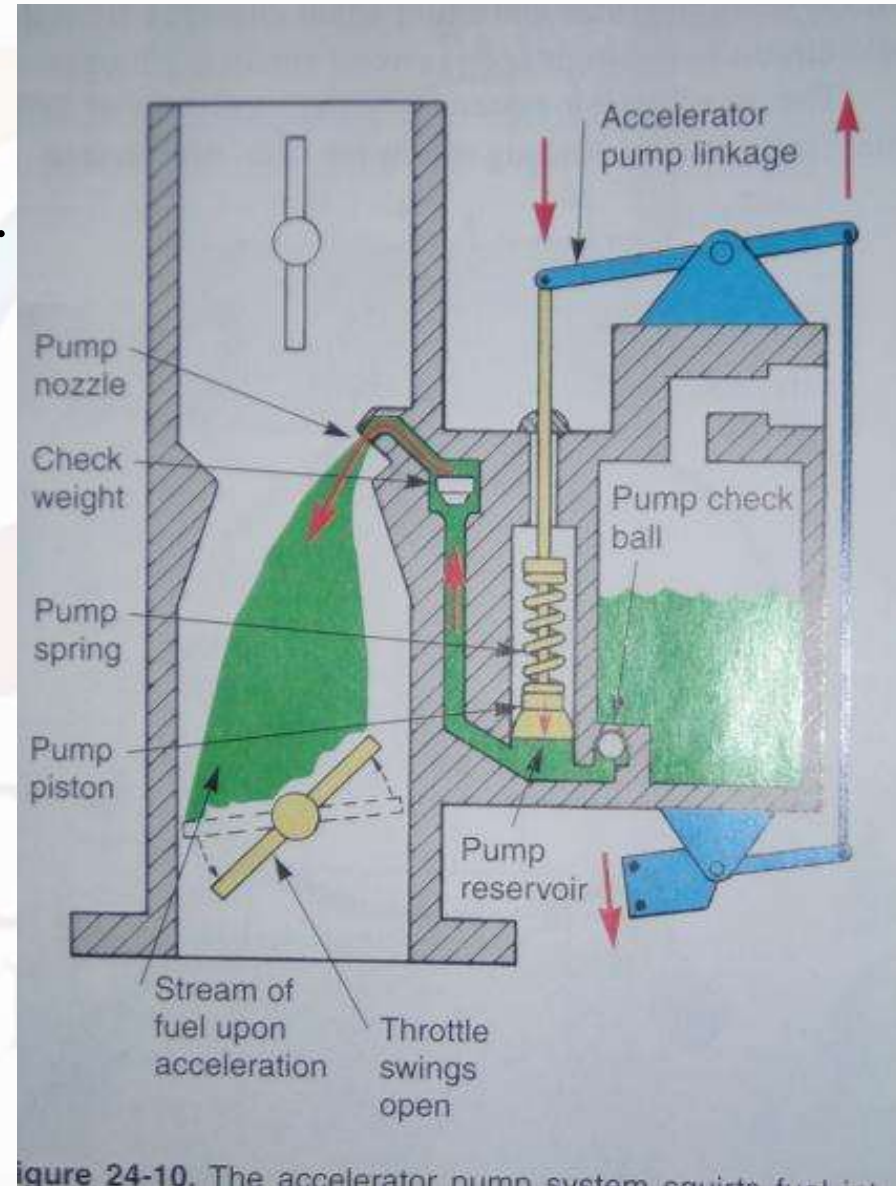


24-8. Off-idle system feeds fuel to the engine when the throttle is opened slightly. It adds a little extra fuel to the

Fuel System

Acceleration System

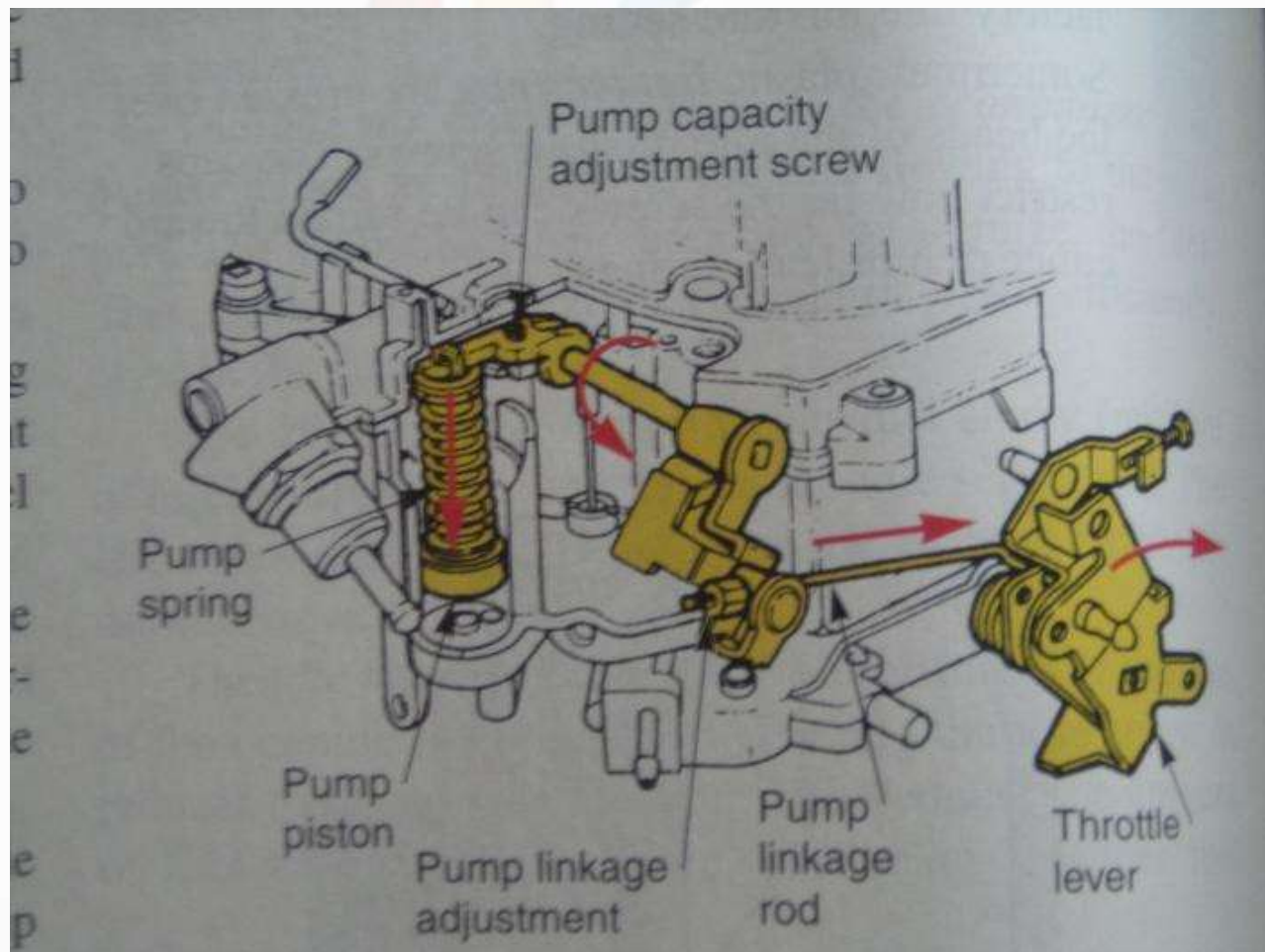
- Accelerator pump squirts fuel into the air horn every time the throttle is opened.
- This adds fuel to the rush of air entering the engine and prevents a temporary lean mixture.
- Pump check ball allows fuel to only enter the pump reservoir.
- Pump check weight prevents the fuel being drawn into the air horn by the venturi vacuum.



Fuel System

Accelerator pumps systems use mechanical linkage from the throttle lever.

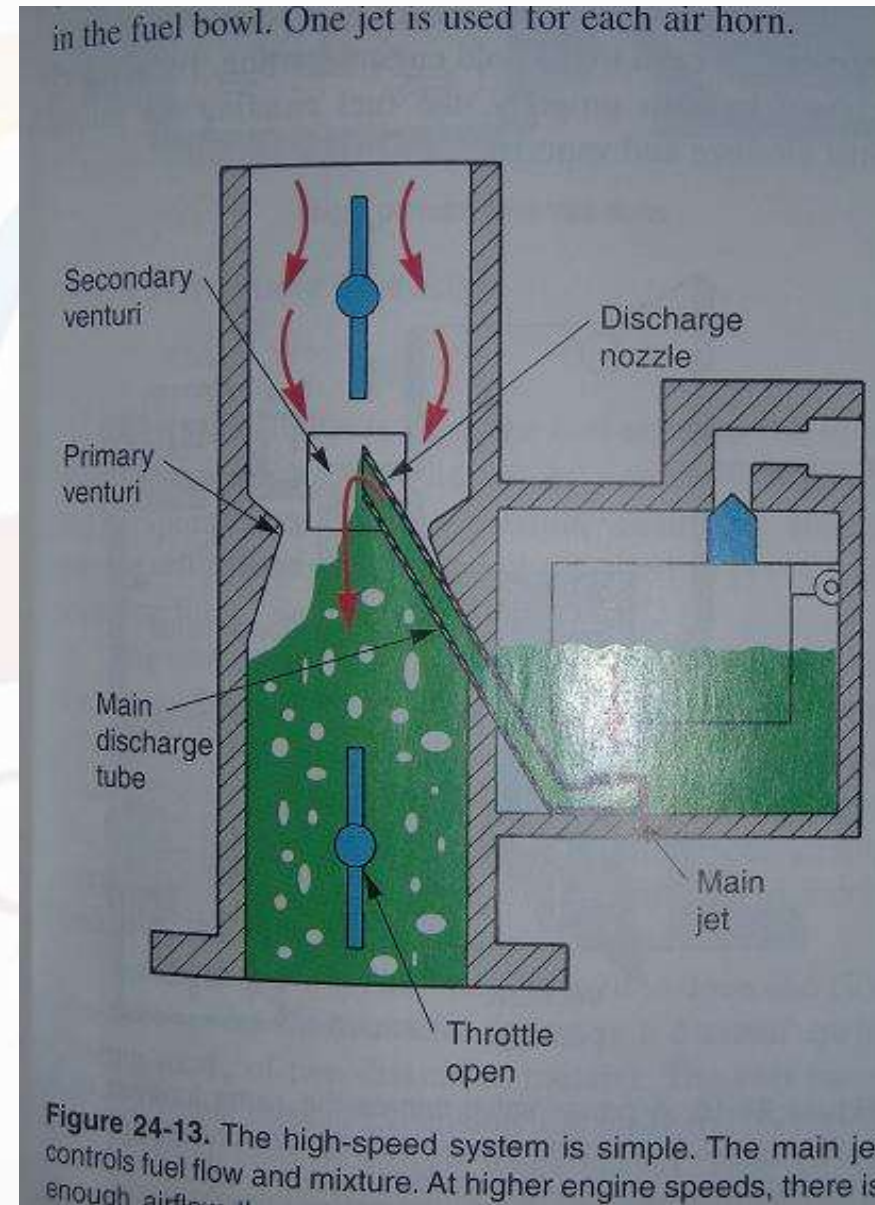
- Upon acceleration, both the throttle valve and pump are actuated.



Fuel System

High speed system (cruising speed)

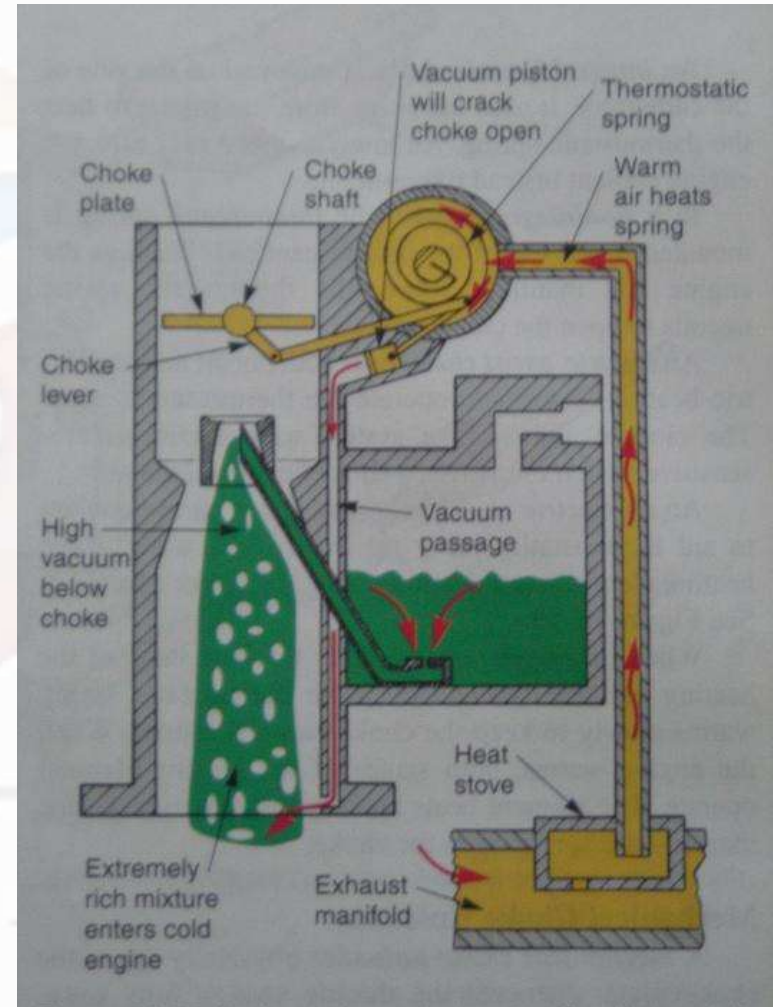
- The main jet controls the fuel flow and mixture.
- At higher engine speeds, there is enough air flow through the venturi to produce vacuum.
- This pulls fuel through the main discharge.



Fuel System

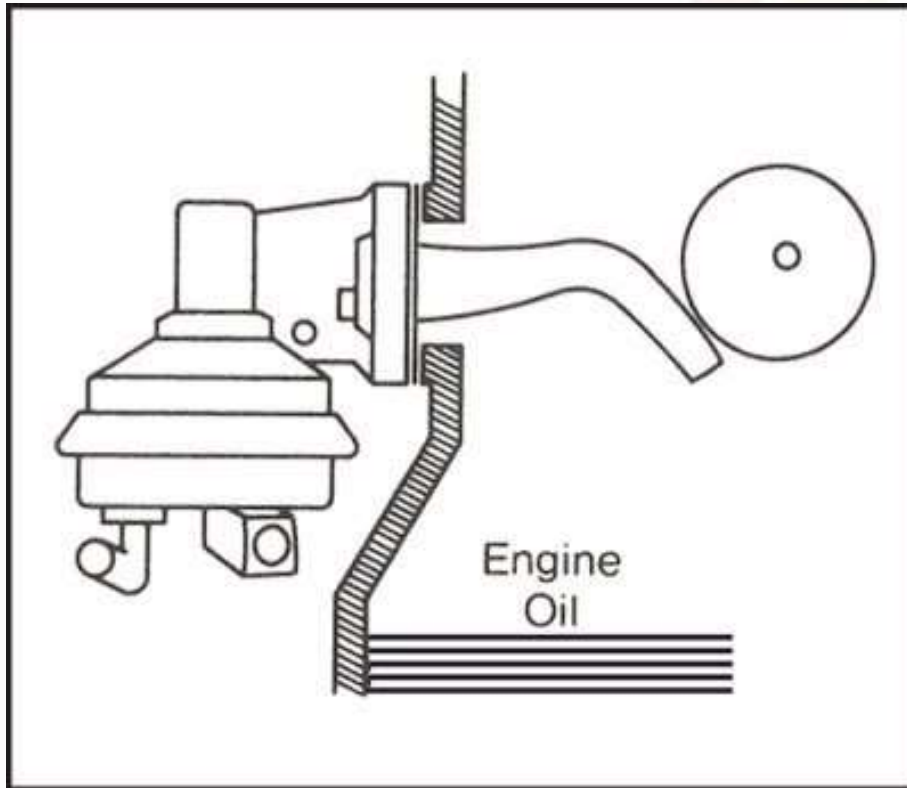
Choke System

- When the engine is cold the *thermostatic spring* closes the choke.
- High vacuum below the choke pulls large amounts of fuel out of the main discharge.
- When the engine warms the hot air opens the spring
- Some chokes are electrically operated.



Fuel System

Fuel pump (mechanical pump operated by cam shaft)



Operates at 3-5 psi.

Fuel System

Fuel Lines (double-lap flair)

- Pressure line brings the fuel from the tank.
- Return line takes the excess fuel back to the tank.



Fuel System

Fuel tank

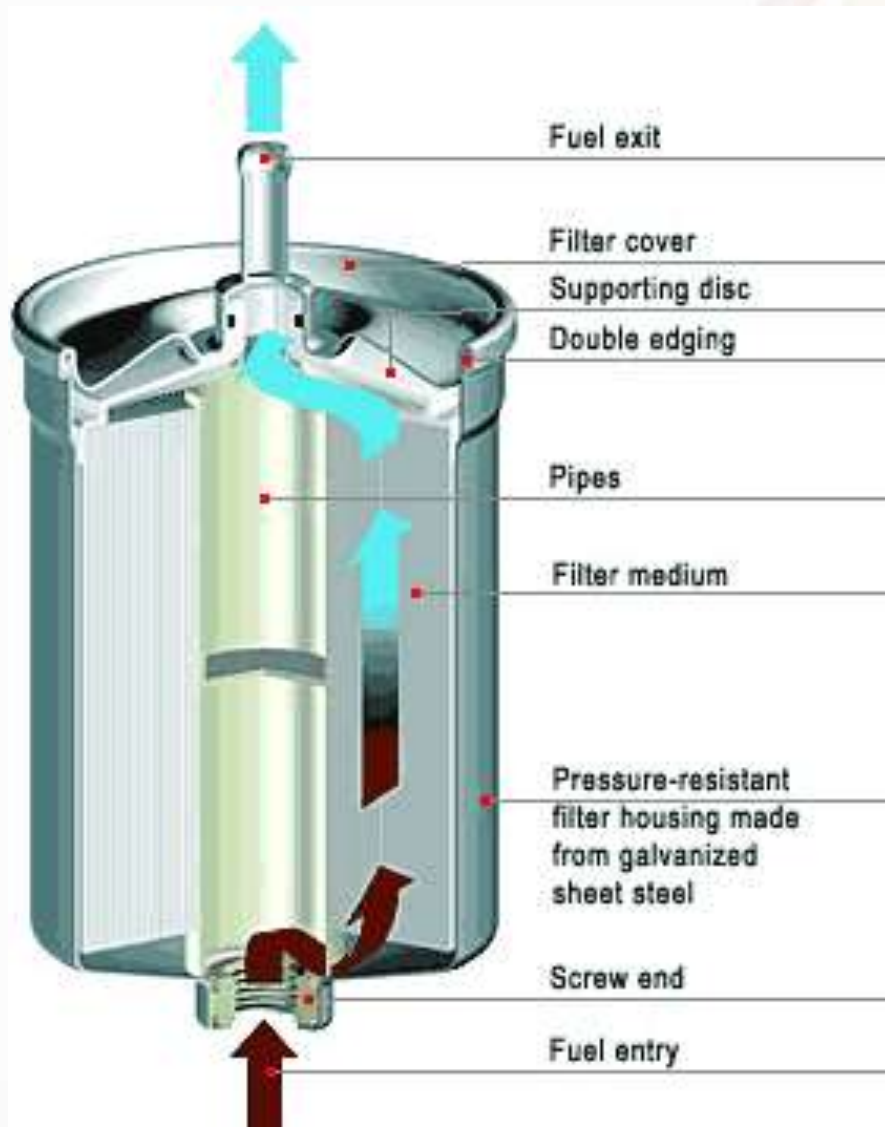
- Holds fuel.



- Holds fuel sending unit float.

Fuel System

Fuel filter is installed in the pressure line to remove contaminants.



Carburetor Problems

- **Carburetor Flooding:** Occurs when fuel pours out the top of the carburetor. Check float level (might be too high).
- **Float level too low:** Will cause lean AFR. Will cause miss at high speed and around cornering.
- **Clogged idle air bleed:** Will effect at Idle, because it can enrich the mixture.
- **Engine Surge:** Caused by extremely lean Air Fuel mixture.
- **Choke system:** will make the engine perform poorly when the engine is cold.



References

1. Kirpal Singh (2011), Automobile Engineering, 12th edition, Standard Publications, ISBN: 978-8-180-14177-5.
2. <https://nptel.ac.in/courses/107/106/107106088/>
3. <https://www.coursera.org/specializations/self-driving-cars>
4. William.H.Crouse (2006), Automotive Mechanics, 10th Edition, McGraw-Hill, ISBN: 978-0-07-063435-0.
5. Joseph Heitner (1999), Automotive Mechanics: Principles and Practices, 2nd edition, Affiliated East West Pvt. Ltd, ISBN: 978-8-176-71015-2.
6. Bosch Automotive Hand Book (2007), 8th Edition, SAE Publications, ISBN: 978- 0-7680-4851-3.
7. K. Newton and W. Steeds (2001), The motor vehicle, 13th Edition, Butterworth-Heinemann Publishing Ltd, ISBN: 978-0-080-53701-6

A large, faded logo of Galgotias University is centered in the background. It features a circular emblem with a stylized 'G' shape inside, composed of overlapping curved bands in shades of yellow, orange, and blue.

Thank you

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