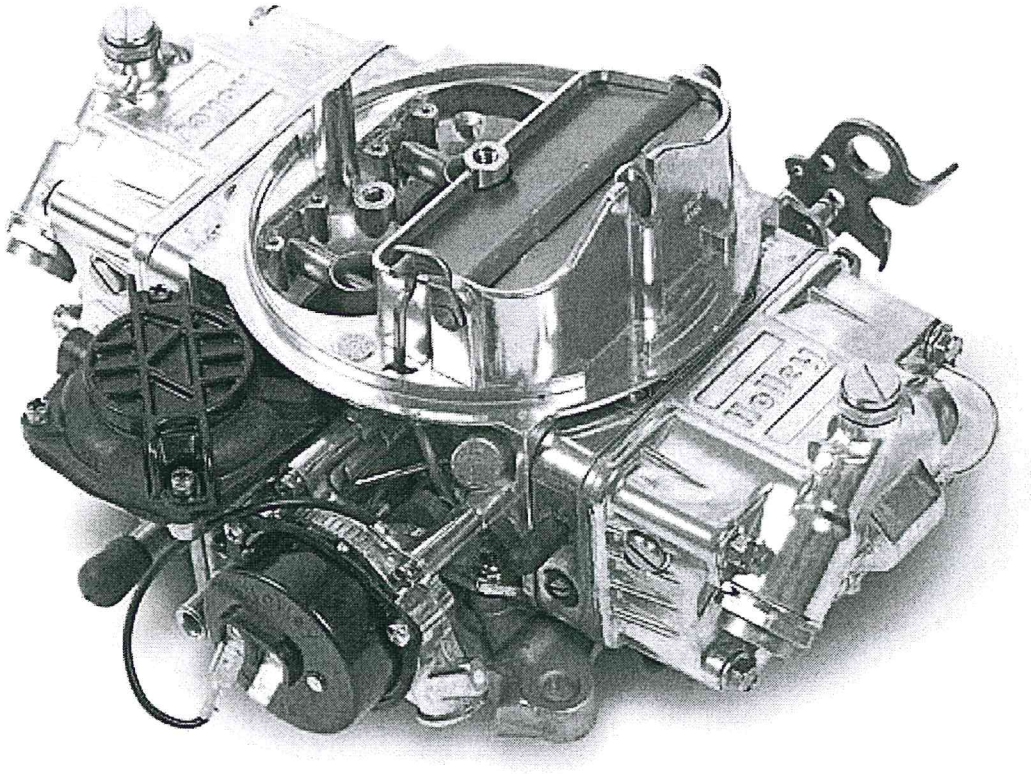
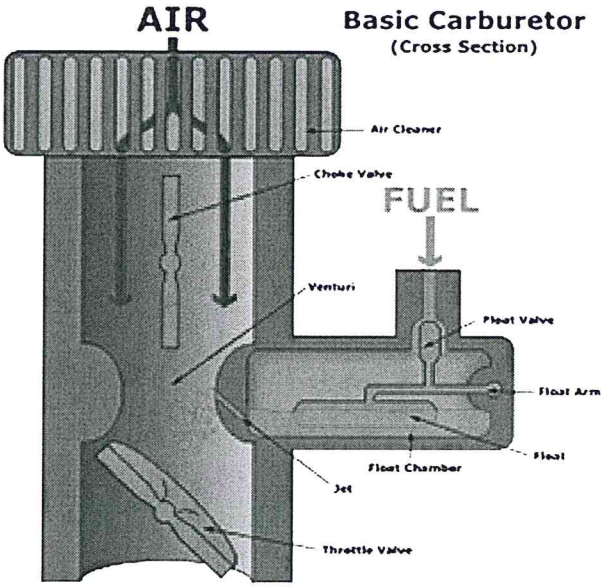
Carburetor Theory



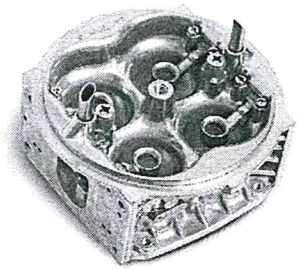
Carburetor Basics
A carburetor is basically a device that mixes air and fuel in the correct proportions (amounts) for efficient combustion. The carburetor supplies a combustible mixture of varying degrees of richness to suit engine operating conditions. When the engine is running the intake stroke creates suction in the intake manifold. Air rushes through the carburetor were fuel is mixed with it.

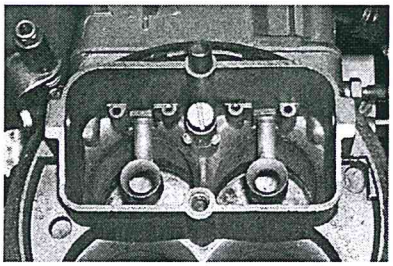
Fixed Venturi



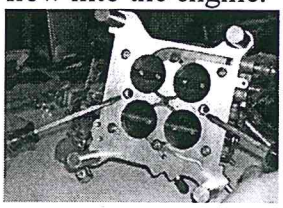
Carburetor Parts (Holley Carburetor)

Body-Is cast metal housing for the components it has cast and drilled passages for air and fuel. Air Horn-also called barrel routes outside air into the engine intake manifold





Throttle Valve-is a butterfly valve located in the air horn when it's closed it restricts air flow into the engine.

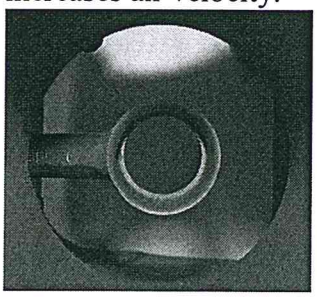


Venturi effect

As air flows through the constriction, or venture, a partial vacuum is produced at the venturi. This vacuum causes the fuel nozzle to deliver a spray of gasoline into the passing air that is entering the engine through the air horn.

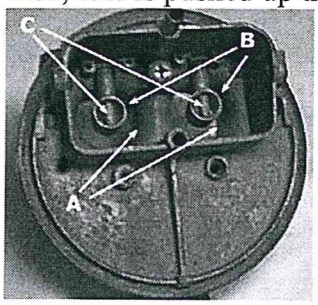
Why is there vacuum at the venturi? The air is made up of countless molecules. As the air moves into the top of the air horn, all of the air molecules move at the same speed. But if all of the molecules are to get through the venturi, they must speed up and move through faster. When they speed up greater space is left between each molecule and this void or partial vacuum exists between the molecules.

Venturi- produces suction to pull fuel out of the main discharge tube the narrow air way increases air velocity.

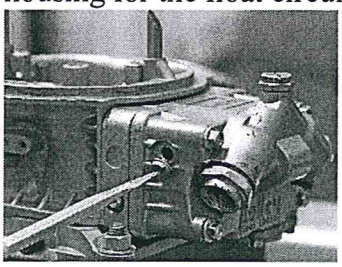


Main Discharge tube-also called main fuel nozzle

The end of the fuel nozzle is in a fuel bowl reservoir and the opposite end is located in the venturi. (It acts like a straw). Atmospheric pressure pushes on the fuel from a vent located in the float-bowl cover. With vacuum at the upper end of the Main Discharge tube, fuel is pushed up through the tube. The fuel enters the passing air as a fine mist.



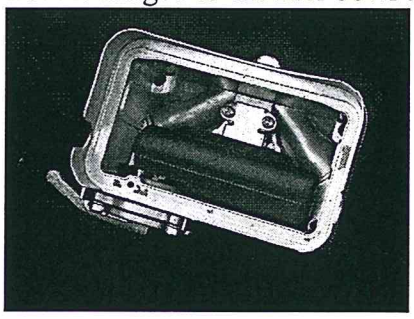
Fuel bowl holds a supply of fuel that is not under fuel pump pressure. It also acts as housing for the float circuit.



Carburetor Circuit
Is a network of passages and related parts that help control the air/fuel ratio under a specific engine operating condition. Each circuit supplies a predetermined air/fuel mixture as the temperature, speed and engine load change. For example, a gasoline engine's air/fuel mixture may vary from a rich 8:1 ratio to a lean 18:1 ratio, depending on the operating conditions. Using the carburetors various circuits it must be capable of providing varying air/fuel ratios:
8:1 cold start
16:1 idling
15:1 part throttle
13:1 full acceleration
18:1 cruising speeds

There are 7 basic Carburetor Circuits

Float System
Must maintain the correct level of fuel in the carburetor bowl, the float system prevents the fuel pump from forcing too much fuel in the bowl. The bowl is also vented to prevent pressure and vacuum buildup. The carburetor float rides on top of the fuel in the bowl to open and close the needle valve. It is normally made of brass or plastic. One end of the float is hinged to the fuel bowl and the other side is free to move up and down.

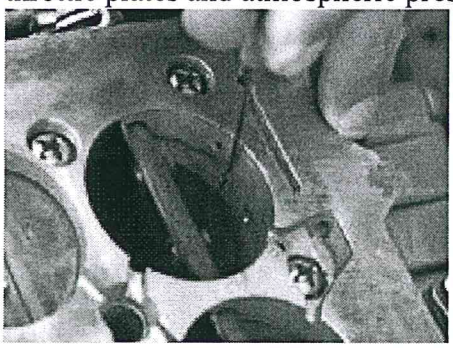


Needle and Seat

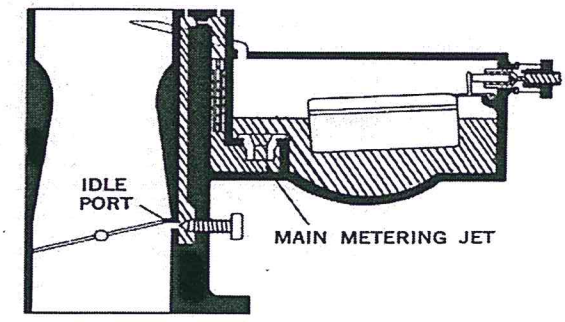
The needle and seat works in conjunction with the float to control the flow of fuel being delivered to the carburetor, it acts like an on/off switch. If the float level is too high, then too much fuel will feed the main discharge tube. If it is too low then not enough fuel will feed the main discharge tube. In either event poor engine performance will result.

Idle System

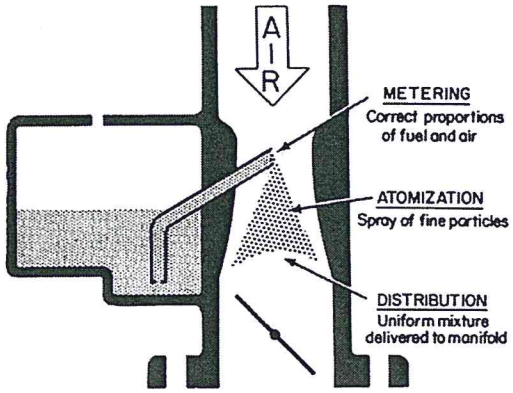
It provides the engine's air/fuel mixture at speeds below 800 RPM or 20 KM/h. The throttle is almost closed there is no venturi action instead high intake vacuum below the throttle plates and atmospheric pressure pushes on the fuel to feed the engine.



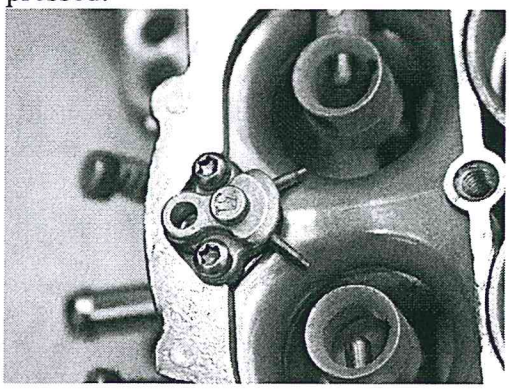
Idle Circuit



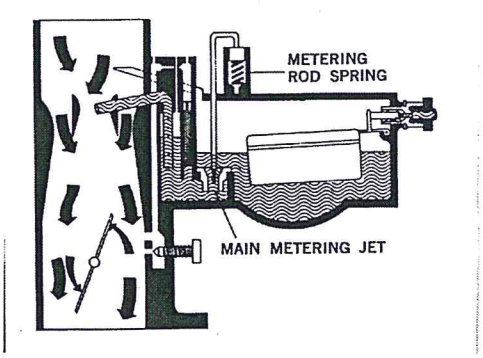
Part Throttle Circuit (low speed)
This circuit feeds more fuel into the air horn when the throttle plates are partially open functions above 800 RPM. Without this circuit the mixture would become too lean off idle.



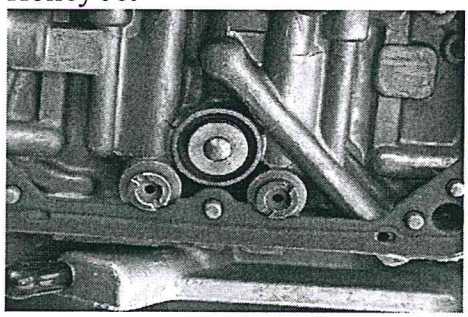
Acceleration Circuit
This circuit provides extra fuel when changing from the idle circuit to high speed circuit. The acceleration circuit squirts a stream of fuel into the barrel when the accelerator is pressed.



Main Metering System
Supplies the engine air/fuel at cruising speeds It begins to function when the throttle plates are open enough for venturi action. Provides the most efficient fuel/air ratio, the jet hole size determines how much fuel flows through the circuit.

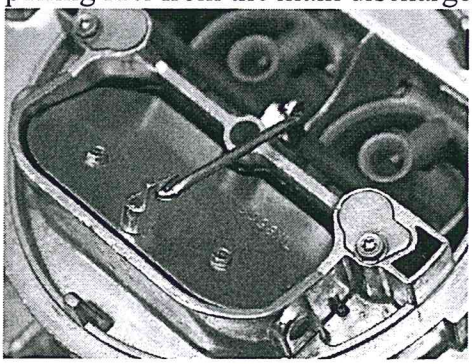


Holley Jet



Full Power Circuit
Enriches the high speed circuit when needed, when the engine is at cruise speed the manifold vacuum is high, the vacuum acts on the diaphragm and pulls the valve closed. When the throttle plates are swung open engine manifold vacuum drops off and the spring in the power valve opens and fuel flows through.

Choke Circuit
This circuit is designed to provide an extremely rich air/fuel mixture to aid in cold starts. It is a butterfly valve located at the top of the carburetor air horn, when it's closed it blocks normal air flow causing high intake vacuum to form below the choke plate, pulling fuel from the main discharge tube.



Circuit Acronym

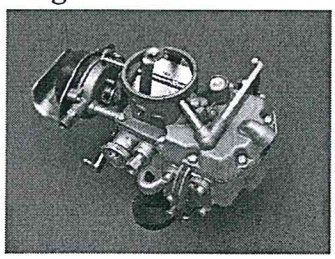
F	Float Circuit
I	Idle circuit
L	Low speed
M	Main metering
P	Power circuit
A	Acceleration circuit
C	Choke circuit

Carburetor Barrels
Multiple barrel carburetors are used to provide increased air intake (engine breathing). The amount of fuel and air enters the engine is a factor limiting engine horsepower output. Extra carburetor barrels allow more air and fuel into the engine at wide-open throttle.

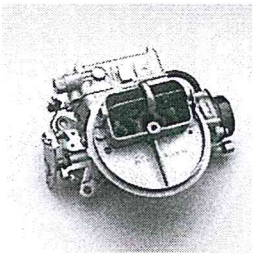
Primary
Are the components that operate under normal driving conditions.
In a 4 barrel carburetor the primary consists of the 2 front throttle plates and related components.

Secondary
Consists of the components or circuits that function under high engine power output conditions; they only function when more power is needed.

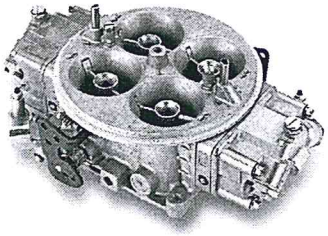
Single barrel



Two- barrel



Four Barrel

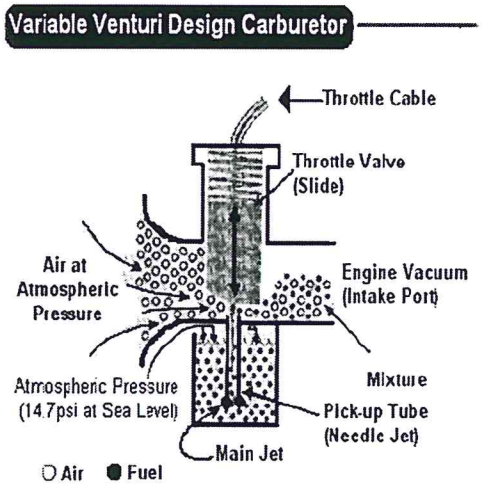


Carburetor Size

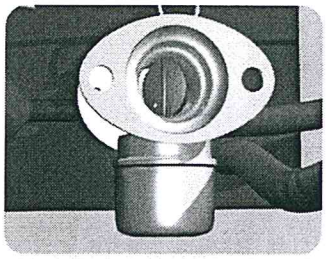
Generally carburetor Size is stated in CFM (cubic feet of air per minute).
This is the amount of air that can flow through the carburetor at wide open throttle. CFM is an indication of maximum airflow capacity. Usually, small-CFM carburetors are more fuel efficient than larger carburetors. Air velocity, fuel mixing, and atomization is better with smaller bores. Larger CFM would be more desirable for high engine power output.

Variable Venturi

A slide-type that has a cylinder-shaped slide that moves in and out of the air horn to help control fuel and airflow.
The piston sliding in and out regulates the size of the venturi. These are commonly used on motorcycles.



Small Engine Carburetors



Review Questions

Answer the following questions in proper sentence structure.

1. Describe in your own words what a carburetor is?
2. What is the term air-horn?
3. What is a venturi effect?
4. Describe why this effect happens to air.
5. Describe the main discharge tube and how it functions.
6. What are carburetor circuits?
7. Describe in your own words the float circuit
8. Describe in your own words the idle circuit
9. Describe in your own words the Low speed circuit
10. Describe in your own words the main metering
11. Describe in your own words the power circuit
12. Describe in your own words the acceleration circuit
13. Describe in your own words the choke circuit
14. What are carburetor barrels?
15. How do carburetor barrels affect performance?
16. Give an example of the different barrels used on gasoline engines.
17. What does the term CFM mean when referring to carburetors?
18. Describe how a variable venturi carburetor functions.
19. Where is this type of carburetors generally used?
20. Write the circuit acronym as it's written in the booklet (F.I.L.M.P.A.C.) this will be on the quiz.