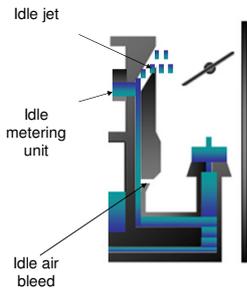




### CARBURETTORS: IDLING JET

GROUND SCHOOL



When throttle butterfly is almost closed the pressure differential between venturi and float chamber is very small

Can cause a "idle cut off" when all fuel flow stops to the engine

Idle jet experiences enough pressure differential and feeds small amount of fuel in downstream of butterfly



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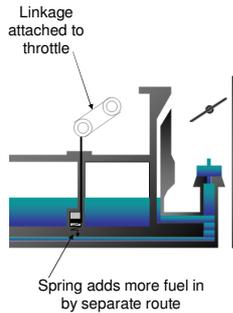
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### CARBURETTORS: ACCELERATOR PUMP

GROUND SCHOOL



If throttle is opened rapidly the amount of air increases initially at a greater rate than the fuel

This would cause the engine to lag and maybe a "weak cut"

Accelerator pump is activated when throttle gets to full power and "spurts" extra fuel into the carburettor



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### CARBURETTORS: MIXTURE CONTROL

GROUND SCHOOL

Engines are designed to run at standard sea level (1013.2 hPa and +15°C)



At altitude there is "less" air and so the aircraft will have too much fuel in comparison to air

The mixture knob / lever can be used to select the best mixture



During climb, mixture should be rich to aid engine cooling  
In cruise, lean the mixture to obtain the best fuel/air ratio and best fuel economy



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### CARBURETTORS: MIXTURE CONTROL

GROUND SCHOOL



It is safer to shut down an engine using the mixture control at "idle cut off"

In this way there is no fuel in the lines and if a magneto has failed and is still live, the engine will not start if someone turns the propeller

Fuel is cut off between float chamber and venturi



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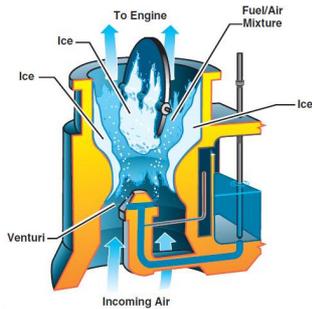
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### CARBURETTORS: ICE

GROUND SCHOOL



CARBURETTOR ICE can form in temperatures up to +30°C

As air passes through the VENTURI, it is forced to speed up and this causes the temperature to decrease

If the air is moist then ICE will form and may block airflow into the engine

This causes ENGINE ROUGH RUNNING and even ENGINE STOPPAGE



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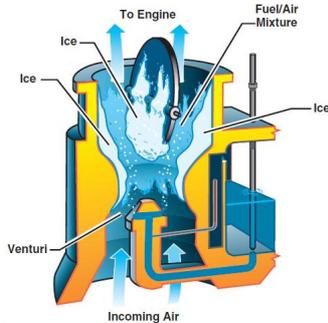
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### CARBURETTORS: ICE

GROUND SCHOOL



This is more likely at LOW POWER SETTINGS where the gap between the THROTTLE BUTTERFLY and the outer wall of the carburettor is smaller

Carburettor icing is ALWAYS likely when the temperature is below +30°C and the aircraft is within 200nm of any sea surface

This must be probably on about 99% of days in the UK!



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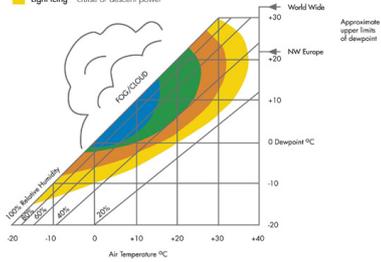
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**CARBURETTORS: ICE**

GROUND SCHOOL

- Serious icing – any power
- Moderate icing – cruise power
- Serious icing – descent power
- Serious icing – descent power
- Light icing – cruise or descent power




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**CARBURETTORS: ICE**

GROUND SCHOOL



ALWAYS use CARB HEAT selected to ON / HOT when using throttle settings below the GREEN ARC on the RPM gauge

Check for CARB ICE every 10-15 minutes by selecting CARB HEAT to ON / HOT for at least 30 seconds

The RPM should drop due to the hotter air entering the engine and the engine should run smoothly

If the RPM does not fall, or RISES when carb heat is on, or the engine runs rough then you have carburettor ice!




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**CARBURETTORS: ICE**

GROUND SCHOOL



What do you do if you have carburettor icing?

Natural instinct when engine runs rough is to put the carb heat back into the off / cold position

**DO NOT DO THIS!**

LEAVE the carb heat selector in the ON / HOT position until the engine has been cleared of ice

Then do checks more regularly!




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GROUND SCHOOL

**PRACTICE QUESTION!**

*In what flight condition is carburettor ice most common – climb, descent or cruise?*

Descent (with low power setting)

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GROUND SCHOOL

**FUEL INJECTION**

Not all aircraft have carburetors – they use fuel injection instead

**ADVANTAGES**

No fuel ice, no carburettor ice, better control of fuel/air ratio, easier maintenance, instant acceleration, increase efficiency of engine

**DISADVANTAGES**

Hot starts are more difficult, small fuel lines are easier to block, surplus fuel may be vented overboard

**X**

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GROUND SCHOOL

**FUEL: CLASSIFICATION OF AERO FUEL**

**AVGAS ONLY**

GRADE 100        GRADE 100LL

CAP. 20.0 US GAL  
STABLE FUEL 19.2)

Aviation Gasoline (AVGAS)  
100LL is used in the UK  
(100 is the octane level, LL is low lead)

**AVGAS100LL**

Colour of AVGAS 100LL is blue

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FUEL: CLASSIFICATION OF AERO FUEL

GROUND SCHOOL



JET A1

Aviation Jetfuel (JET A1)

Colour of fuel is straw

Always confirm the fuel that your aircraft uses!



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FUEL: CLASSIFICATION OF AERO FUEL

GROUND SCHOOL



Motor Gasoline (MOGAS)  
Subject to rigorous conditions of use

CAA Safety Sense Leaflet 4A and  
Airworthiness Notice 98 refer

FUEL TYPE AND GRADE	COLOR OF FUEL	EQUIPMENT COLOR
AVGAS 80	RED	RED AVGAS
AVGAS 100	GREEN	GREEN AVGAS
AVGAS 100LL	BLUE	BLUE AVGAS
JET A	COLORLESS OR STRAW	JET A

Can only be used in certain aircraft



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FUEL: INSPECTION

GROUND SCHOOL



Before flight all drain points on the aircraft should be inspected for fuel contamination

Check colour is correct  
(don't check avgas is blue by holding up tester to a blue sky!)

Check no "bits" in the strainer  
(metal, dirt, paint etc)

Check no water is in the strainer  
(it will sink to the bottom because it is heavier)

Check smell  
(however be aware that only a small amount of fuel will cause water to smell)



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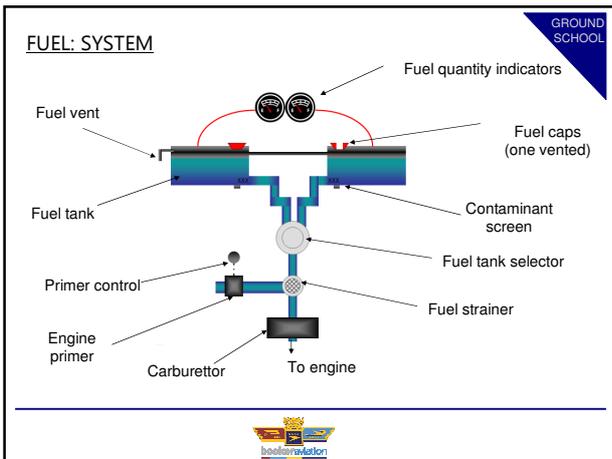
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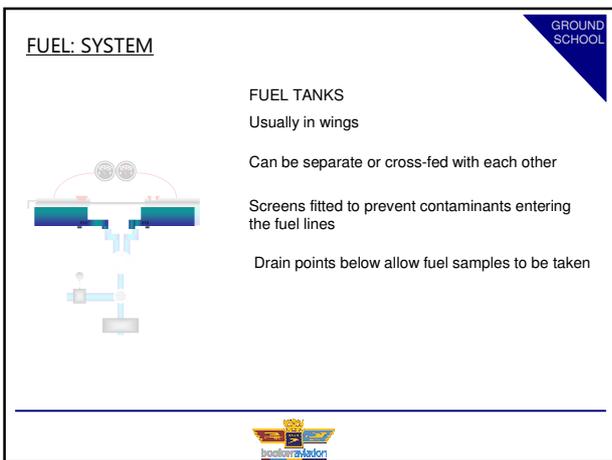
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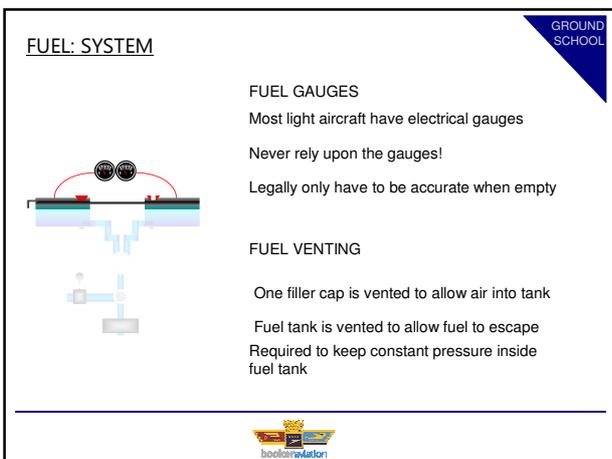
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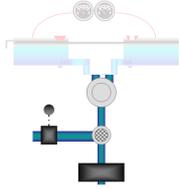
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**FUEL: SYSTEM**

GROUND SCHOOL



**TANK SELECTOR**

To select individual tanks (in Cessna 152/172 the fuel is crossfed from both tanks at the same time)

**FUEL STRAINER**

Allows fuel sample to be taken from lowest point in system

**PRIMER**

Allows neat fuel to be fed direct into cylinders for starting (use during flight would cause a rich cut)

In low winged aircraft a fuel pump will be required for starting to begin flow of fuel. High wings rely on gravity.



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**PRACTICE QUESTION!**

GROUND SCHOOL

*As the aircraft climbs the air density increases/decreases and so the fuel/air mixture becomes weaker/richer*

Air density – decreases  
Fuel/air mixture – becomes richer



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**FIRES**

GROUND SCHOOL



All fires associated with aircraft can be dangerous – always know how to extinguish each type of fire that could occur

Most extinguishers work on eliminating one side of the "fire triangle"



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**FIRES: EXTINGUISHERS**

**GROUND SCHOOL**

**WATER** extinguishers used for:



Wood 

Paper 

Cloth 




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**FIRES: EXTINGUISHERS**

**GROUND SCHOOL**

**FOAM** extinguishers used for:



Wood 

Paper 

Cloth 

Flammable Liquids 




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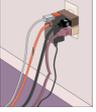
**FIRES: EXTINGUISHERS**

**GROUND SCHOOL**

**CARBON DIOXIDE** extinguishers used for:



Flammable Liquids 

Electrical Fire 




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**FIRES: EXTINGUISHERS**

GROUND SCHOOL

**DRY POWDER** extinguishers used for:



Flammable Liquids

Flammable Gases



Electrical Fires

Wheel Fires



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**FIRES: EXTINGUISHERS**

GROUND SCHOOL

**BCF HALON** extinguishers used for:



Anything!

BCF Halon is now illegal in the UK except in an aviation setting

With all extinguishers – ALWAYS ventilate well after usage to ensure you don't run out of oxygen!!



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**PRACTICE QUESTION!**

*Which is the safest extinguisher to use on a wheel fire*

Dry powder



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Lecture complete  
Any Questions?



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