

Website – our website is proving useful. In only 6 weeks of existence we have already had over 170 visitors to the site. I have had calls from a couple of interested people some of whom have already visited the field and one new trainee pilot who is going to become a member. We are now 'Live' On the web too. Try Googling 'howick model flying club' and we will appear. Go to our links page and click on 'Shongweni Model Flying Club' they have a great site full of information. We are even 'international' and are now listed on Tower Hobbies website under International Flying Clubs!

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## ***Safety***

Please can all members be aware that no taxiing of aircraft or Hovering of Helicopters is permitted in the pit areas.

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## ***Klein Fogleman Airfoils theory and practice***

Boet Naude has sent in this interesting article on different wing profiles, for us this is mainly applicable to electric foamies, however if you google 'Klein Fogleman Airfoils', there are some interesting other articles out there on this different way of thinking. To read the full document [click here](#)

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## ***Ringed Engines vs. ABC Engines***

Many R/C Engines come in both ABC and Ringed versions. The ABC type engine has an Aluminum piston, a Bronze cylinder sleeve, and Chrome plating on the cylinder sleeve or a variation where Nickel plating is substituted for the Chrome plating. These engines have a tapered cylinder which changes to a non-taper when at operating temperature.

The other type of engine is the ringed engine. This engine has a piston ring. The cylinder is not tapered. It is the ring which prevents gas from passing by the piston (blow-by). The ring has spring tension which forces it against the cylinder wall at all times. This is why it is not necessary to taper the cylinder walls during construction. There is one other important difference. The cylinder walls are not plated bronze. Instead, they are constructed of a porous metal. This means that it has many tiny holes in the metal structure. During engine operation, carbon from the burnt gases will begin to fill these holes on the surface of the cylinder. This carbon makes an excellent lubricant. The piston ring is not porous.

What does this mean to the user? The ABC type engines can typically withstand more heat before they are damaged. More horse power is available from these engines if the fuel mixture and prop sizes are changed to push the engine harder. However, because the cylinder walls are tapered at low temperatures, they can be harder to start.

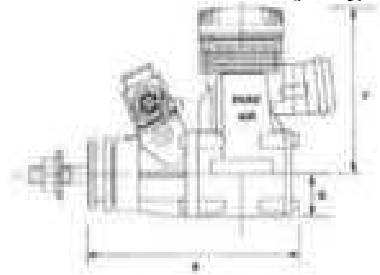
The ringed engines start easily since the ring prevents blow-by even when the engine is cold. However, all of the friction in a ringed engine takes place at the ring itself, a relatively small area. Also the porous cylinder material does not dissipate heat as fast as the bronze cylinder in the ABC type engine. This means that the engine is more easily damaged by too much heat.

Because of these characteristics, you can expect that the safe operating temperature range of the ringed engine to be shifted lower than the ABC type engine. This means that the ringed engine will require good lubrication at high r.p.m. Since castor oil has a much higher flash-point than synthetic oil, your fuel should contain at least some castor oil. You should also avoid running your engine too lean.

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## ***Running in your ABC type Engine***

Few topics develop more controversy than ABC type (ABN, AAC, ABL, etc..) engine break-in. With so many engine instruction manuals giving



conflicting information regarding ABC type break-in, it's no wonder many folks are confused.

Lets first discuss why ABC engines are broken in differently than ringed or lapped iron piston/ sleeve engines: ABC type engines all have one thing in common, which is the tapered bore and ring-less piston. With the tapered bore, there is an interference between the piston and sleeve above the exhaust port when it is at room temperature, this is referred to as the "pinch". When the engine comes up to operating temp, the top of the sleeve expands (where the combustion heat is) where there is a near zero clearance between the piston and sleeve. This happens because the brass sleeve (in the case of the AAC engine, the aluminum sleeve) has a higher coefficient of expansion, expanding faster and greater than the high silica aluminum alloy that the piston is made of. It is important to get the engine up to operating temp as soon as possible to relieve the pinch so the stresses exerted from the piston pinching in the sleeve are kept to a minimum. If an engine is run too cool (rich), the sleeve does not expand to design fit (near zero clearance) resulting in an engine that will die when it gets warm because the piston

actually wore down to fit the cold tapered bored sleeve. If the engine is run too hot (too lean), the sleeve expands further than the piston, resulting in excess clearance between the piston and sleeve, causing combustion gasses to blow past the piston making the engine fade, sag or die. Not to mention that lean needle settings also starve your engine of oil too. One critical measure we can all take with a new ABC type engine to break it in properly and tune it properly. The other critical measure is to use a quality fuel containing some castor oil in it with a percentage of nitro that the manufacturer recommends.

Break-in of an ABC-type engine is quick and simple.

**1st-** Partially disassemble the engine, at least remove the head and backplate to inspect the inside for shavings, flashing or debris. Flush it out good with some old fuel to get any fine metallic dust particles left over from the machining process, out of the engine. You would be surprised at how much metallic dust can be flushed out of a new engine, do the flush in an old white cool-whip container and you will see for yourself!

**2nd-** Install your engine in the plane or engine run stand, fill the tank full of fuel and then set all the needle settings to what the initial settings are in the owners manual. Both the low speed and high speed settings in the manual are a starting point. If the engine has an exceptionally tight pinch, making it hard to turn over, you may want to heat up the cylinder head with a heat gun or other means to relieve enough pinch to get it started.

**3rd-** Fire it up! On a plane, just take it to wide open then adjust the needle so it breaks into a clean two-stroke running condition (no longer sputtering or missing). Do not lean it out to maximum rpm's. Now just let it run wide open for 2 to 3 minutes.

**4th-** After the initial 2 to 3 minute run, shut it down and let it cool completely before



doing it again. DO NOT force the engine to cool by pouring alcohol or fuel over it, let it cool naturally.

**5th-** After its cooled down, fire it up again and do the same thing, Just run it a little harder this time. Make sure the high speed needle setting is still allowing it to break into a good clean 2-stroke run, you may have to lean it slightly. Now you want to start paying attention to the low speed needle and start adjusting for crisp throttle response off idle. Shut it down after 2 to 3 minutes of running it and let it cool.

**6th-** Again, after a complete cool down, do it again, running it even harder. Now you need to start leaning into the high speed needle a little bit closer to optimum running and get the low speed needle closer to a good clean crisp response. Shut it down after 2 to 3 minutes of running and let it cool completely. **Repeat the 6th step** a couple more times.

**7th-** By this stage you should have run the engine at least 5 times for 2 – 3 minutes allowing it to cool completely between runs. Set the high speed needle so it runs cleanly without sagging when wide open. If it sags, richen it up. As the engine accumulates more run time the tune will change slightly, thats normal, just be aware of it.

**8th** – by now its time to get airborne – fill it up and get flying, just keep the engine slightly rich of the max rpm setting and run another 5 10oz tanks through it.

As long as you do not run your ABC Type engine too cold (rich) or too hot (lean) you will have an engine that will perform the way it is designed to and have a nice long healthy life.

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And finally.....a modellers prayer –

Dear lord,

When I die please don't let my wife sell all my models for what I told her I paid for them.

Wishing you all a prosperous new year

Clive McInnes