Airbox or not ???

People often ask whether an airbox should be installed in the aircraft or not.
Basically, the aircraft manufacturer is the first point of contact here, because the answer depends not only on the cost but also on the weight.

From the engine's point of view, there is only one correct answer and that is quite clear: **yes**!

There are three main reasons for this:

- the intake air is drawn in at ambient temperature
- carburetor preheating can be installed
- the carburettors are stabilized and vibrate less

Intake air temperature

As the intake air is drawn in from outside the cowling, it is always „fresh and cool“ or at least not warmer than the ambient temperature of the aircraft. This always means the highest possible filling, accompanied by the highest possible performance.
It is well known that the density of the air decreases with increasing temperature, so that we have fewer oxygen molecules available for combustion.
How the intake air is routed and where the air filter is integrated is ultimately the task of the vehicle manufacturer.

However, it must be borne in mind that carburetor preheating is required. How this is designed is of secondary importance. The supply of preheated air from the engine compartment or intermediate flanges, which are attached to the carburetor and heated by the cooling water, have proven to be effective.

Carburettor stabilization

By connecting the two carburetors and attaching the airbox, usually to the engine or the airframe, a mechanical „calming“ of the carburetors is achieved.
This results in significantly less vibration on the carburetor and therefore less wear on the mechanical components in the carburetor.
In particular, the float suspension, the pins in the floats and the slide piston are greatly relieved as a result.

Another consequence of strong carburetor vibrations is an increase in the float level. This is caused by the SNV (float needle valve) wobbling back and forth in the valve seat. A higher closing pressure at the Viton tip of the SNV is required to achieve the correct seal and to interrupt the fuel flow. This is only achieved when the float is immersed deeper into the fuel and therefore leads to a higher fuel level and consequently to a richer mixture.

Carburetor tuning

I recommend downloading the Installation Manual and working through the **Air intake system** chapter (from page 103).
Here, all the requirements for the engine's intake system are discussed and all the parameters to be tested during installation, which must be observed by the vehicle manufacturer, are also listed.

As always, I recommend comparing the installation manual with the actual installation situation of the engine.
This may help you to find „built-in“ problems....

From:
https://www.kleinjung.de/rotax/ - **Ralle's ROTAX FAQ**

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