Bern Formula Student

AQUILA

Berner Fachhochschule
Haute école spécialisée bernoise
Bern University of Applied Sciences

Newsletter Spring 2021

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Bern Formula Student is proud to announce that our single-seater AQUILA will soon be ready for its dynamic test phase. Despite this difficult period, you are still maintaining support for what are very grateful. From financial contribution to the supply of materials to technical advice - your support is highly appreciated and allows us to achieve our goals and dreams.

Thanks to you AQUILA's arrival is imminent

We are in the final phase of a demanding building period. Chassis and suspension are complete. Essential for dynamic performance, aerodynamic parts such as rear and front wings are ready for their clear coat finish. A lot of work and effort by the Aero team led by Max Ceppi has enabled us to make it on time.

Carbon Fiber

For the 3rd consecutive year, we are using carbon fiber to manufacture side-panels, fins and various components. Working with fiber requires patience, dexterity and precision.
Let's have a look at different steps of carbon fiber processing:

No molds, no parts! The molds were meticulously cut by CNC machines for optimum regularity and precision. Once delivered, we carry out the finishing by hand for a smooth surface.

Mold for one side wing with core-material cut in shape.

Once the molds ready, make way for carbon!
Delivered in long rolls, carbon is still in fabric state.

Rear wing fin with 3D-printed skeleton rips.

Only when combined with epoxy resin it will find its desired strength.
To do this, carbon fibers are put into molds. Important are number of layers, fabric weight and the use of reinforcing core-material, depending on application of the part.

Several parts are equipped with additive manufactured skeleton rips (left image) instead of classic core-material (as seen on the image above). They keep the parts lightweight whilst ensuring high strength.
Once the fibers are in the molds, a layer of a special fabric gets added to allow the resin to spread evenly across all of the carbon.

The mold is packed into water- and airtight bags. Air inside then gets evacuated and hardening resin slowly sucked in. Ideally there is a 50:50 ratio between carbon fiber and resin - too much resin leads to an un-necessary heavy part, too little results in a decrease of strength. The hardening and drying process takes twelve hours, then the part is being removed from the mold.

Laying the fabric into the mold of the side wing.

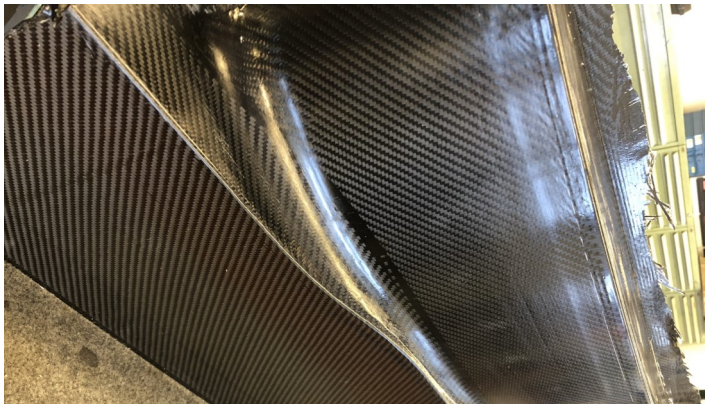
Now, it's ready for the next and second last step:
To ensure perfect fitment, edges are reworked and overhang cut. Due to very small particles of carbon fiber dust we protect ourselves with appropriate safety equipment.

Finally, the parts get a clear coat for a supreme look and design and sponsor stickers are added.

Vacuum bag with the fresh infuse resin.

Right: Side wing after removal from the mold.

The overhang on the right end is well visible and has to be cut off.



Raw body parts mounted on chassis.

Cutting the side wing for perfect fitment.

Attaching the side wing to the body.

Lights on **Max Ceppi**

Your position in BFS?

I am the teamleader of aerodynamics, steering and brakes departments. Those are made up of a total of seven people. My motivated team and I ensure the proper development of the steering parts, the braking system and the aerodynamic and body parts.

What has this project brought to you personally? Professionally?

From a human point of view, this project allowed me to create solid friendships and good memories. It also allowed me to develop my knowledge and skills in several fields such as carbon fiber construction or project management. Finally, from a professional point of view, this project gave me the opportunity to make contacts in the world of work and to show that I am motivated to put in a lot of effort for the success of a project.

What does participating in Bern Formula Student team mean to you?

It means taking on the unknown through an ambitious and exciting project and swapping hours of sleep for knowledge in order to gain an advantage in the interuniversity Formula Student competitions in summer.

What are you particularly proud of this year?

This year has been marred by covid and the restrictions imposed have brought us both technical and logistical difficulties. I am proud to have taken the lead of the aerodynamics team during the season and to have got it ready for the first track tests which will take place soon.

What are your expectations for the car and its performance?

Our main objective was to build a more reliable car than in previous years to make sure we finish the most difficult event in competition, endurance. It's a race of about twenty kilometers. In addition to our increase in reliability, we should also be more performant, I am looking forward to confirming this during the tests.

Rather raclette or fondue?

Fondue without discussion. Or raclette with bread instead of potatoes... so almost a fondue.

Last question, what is your favorite car?

Mazda 787b

Alain Morand, Team Principal:

These are challenging times, but we only know one direction: Forward!

I am very proud of the team and the steps we have achieved in the last few months. All components are produced and being assembled. Body, chassis, steering and brake systems are mounted. There is still electrical work to be done but I am confident that we will have the first test drives the next month.

If the situation allows it we are looking forward to welcoming you in May at our roll-out.

Until then the I wish you a good time.

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