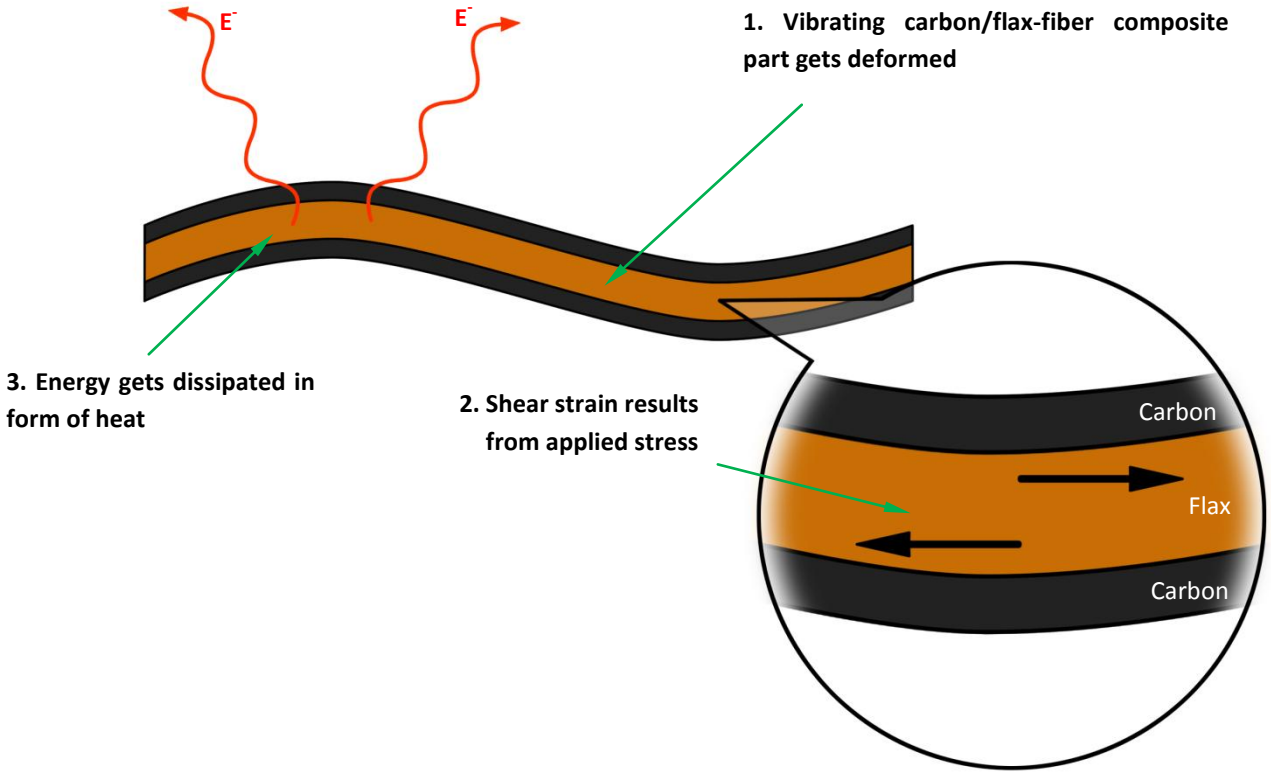
Bcomp Damping User Guide

Did you know that flax can make your carbon fiber parts lighter, stiffer, cheaper and solve your vibrations problems all at once?
Bcomp shows you how!

How the heck does it work?

Everybody claims that natural fibers have very good damping properties. However, nobody tells you how to apply them to benefit from this effect. In fact, the vibration absorption of flax does not only depend of the quantity of flax used, but rather of where it is placed and how it is loaded. One of the most efficient ways to get damping is to use so called constrained-layer damping (CLD). Flax with its slightly viscoelastic properties is suitable as a core material for CLD.



There are other materials which are suitable as core material for this technique. Standard layers are usually made from highly viscoelastic polymers with poor structural properties, relatively complicated to integrate during processing and adding a lot of weight to the structure. In comparison, flax is light, has great structural properties and is processed the same way as carbon.

How will the constrained-layer damping affect my work flow?

If you already work with composites it won't change your workflow at all. Flax products can be converted with all standard processes (VIP, RTM, BIM, Wet Layup, …). Bcomp flax fabrics are engineered to have a very good compatibility with all carbon fiber types. The elongation at fracture of 1.5% and the coefficient of thermal expansion of near 0 are similar to carbon.

The combination of flax fibers with glass fibers can be done without difficulty as well. Since the even greater difference in density between glass fibers and flax fibers, many of the effects described in this document are even more pronounced.

To get void free laminates flax has to be dried at about 110°C (230°F) for 15min prior to laminating.

And what about working with Prepregs?

Apart from our standard prepregs, Bcomp is very flexible and can adapt the resin of our prepregs according to your specific needs. Contact us and we will send you an offer.

How much flax do I have to put in my carbon fiber parts?

There is no general answer to this question because it depends on the geometry of the part, and on which criteria it is optimized. However, making 50% of the thickness of the final part from flax is a good starting point. That's where the specific bending stiffness is at its optimum.

An example:

These two laminates have the *same weight* per square meter. However, flax being lighter than carbon, the flax/carbon sandwich is about 11% thicker than its pure carbon reference part:

The bending stiffness and the resistance against buckling are disproportionately increasing to the thickness of a part. The carbon-flax sandwich construction therefore results in:

- A 24% higher bending stiffness and resistance against buckling
- An 11% higher bending strength
- additional damping

So what's the catch?

There isn't any! There are even some more advantages:

- Due to the toughness of flax fibers the damage tolerance of the part is increased
- Flax doesn't splinter and can keep broken carbon parts together
- Flax can improve the properties against impacts of generally fragile carbon fiber parts
- Flax being cheaper than carbon, replacing some of the carbon will reduce the cost of your final part

Still some open questions? Feel free to contact us: contact@bcomp.ch