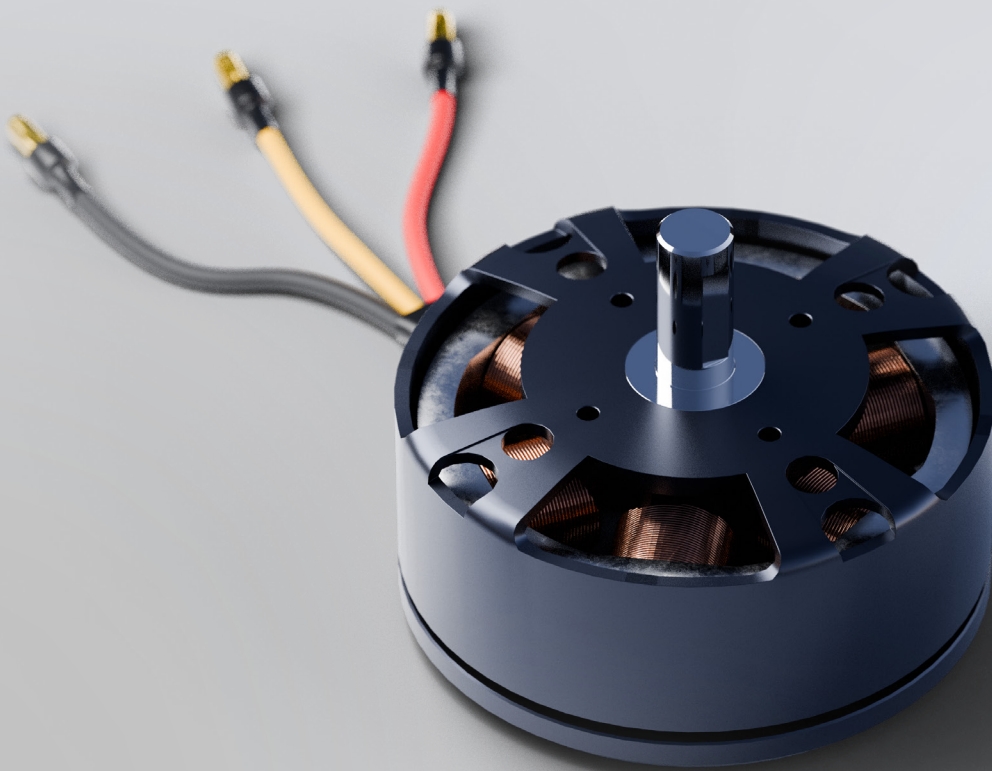


The Sustainable Choice: SMC.

Unveiling the Power of Soft Magnetic Composites for Stator Design.



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At Sintex, we are experts in Soft Magnetic Composites (SMC) which entails various relevant applications, for example as stators in motors. As compared to traditional stators, the SMC possesses 3-dimensional properties. By exploiting these 3D properties, the component design can often be made smaller, lighter and more economic, and as such integration with the surrounding system also becomes easier as the number of geometric limitations is reduced.

But there is more to SMC than meets the eye. Let us delve into the sustainability aspect, highlighting why SMC outshines the conventional choice of laminated steel.

Choose Sustainability, Choose SMC

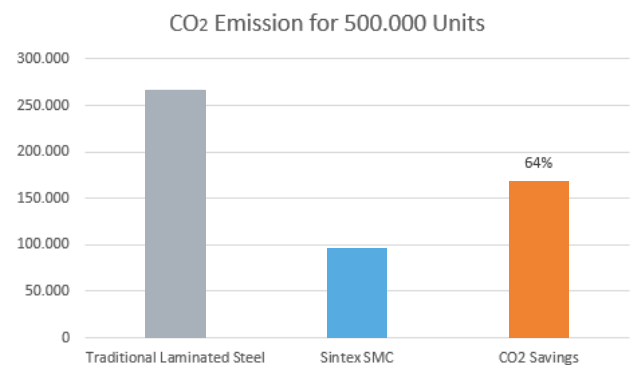
Now, let us delve into why SMC stands head and shoulders above traditional laminated steel, making it the ultimate sustainable choice. Two key factors demand our attention: the amount of material used and the CO₂ emission in the production process.

By utilizing SMC, it is possible to optimize the design of the stators which leads to a reduction of the material used, specifically the amount of copper used. This can be done while maintaining the same number of windings in the stator and the total weight of the stator is brought from 414,5 g to 318,8 g.

Optimizing design with SMC allows us to slash the material requirement, particularly the amount of copper. While maintaining the same number of windings, we achieve a significant weight reduction in the iron core – from a hefty 242 g to merely 203 g.

In a laminated stator, the normal weight of copper is 172,5 g whereas in the SMC version the total weight of copper is reduced to 115,8 g. Thereby, the amount of copper used is reduced with 67%. A positive side effect to the smaller amount of copper used will naturally be a reduction in the material costs but it also ensures that we do not overutilize the natural materials from earth.

When it comes to CO₂ emissions during production, the gap between SMC and laminated steel becomes crystal clear. The laminated steel used in the traditional version of a stator, emits 2,193 kg CO₂ per kg material produced (Worldsteel Association). In contrast, the SMC materials only emits 0,95 kg CO₂ per kg material produced. Thereby, the CO₂ emission is 64% less when using SMC materials. The below graph illustrates the CO₂ reduction:



Combined with the previously mentioned benefits, it is evident that the SMC version has huge potential compared to the traditional laminated steel version. Both for sustainability, design optimization and cost savings.

An example – 285.163 kg reduction in CO2 emission

To put these benefits into perspective, let's embark on a journey through a fictional customer example. Imagine a scenario where our esteemed customer requires 500,000 stator units for their motors. Let's examine the CO2 emissions for both the traditional laminated steel version and the SMC version.

First considering the traditional version with laminated steel, the amount of CO2 emitted for 500.000 units with a weight of 242 g would be:

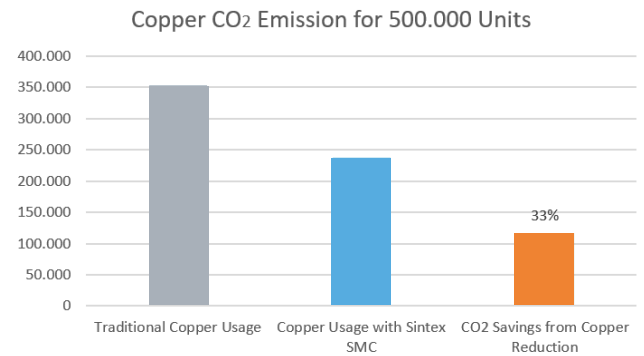
$500.000 \text{ units} * 0,242 \text{ kg/unit} * 2,193 \text{ kg CO}_2/\text{kg material} = 265.353 \text{ kg CO}_2$

Considering now the SMC version with a weight of 203 g, the CO2 emission would be:

$500.000 \text{ units} * 0,203 \text{ kg/unit} * 0,95 \text{ kg CO}_2/\text{kg} = 96.425 \text{ kg CO}_2$

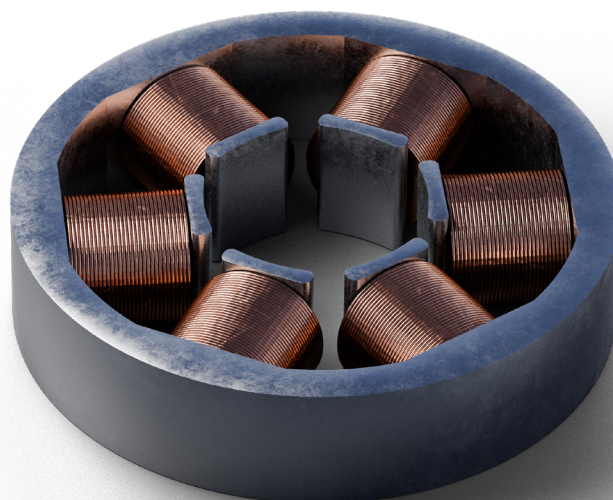
Therefore, the CO2 reduction would be 168.928 kg by choosing the SMC version as compared to the traditional version.

On top of that we also have the copper reduction. According to the German Copper Institute for European Copper Wire Production, the CO2 footprint for Electric Copper wire is 4,328kg CO2e/kg material. Due to the fact, that a traditional stator brings a copper weight about 172,5g and a stator utilizing SMC only bring 115,8g the CO2-reduction here is clear, as illustrated below:



Therefore, in total for this customer case it gives a total CO2-reduction of 285.163 kg CO2 per year.

We believe that the numbers speak for themselves. Sintex's SMC solutions offer an unprecedented leap forward in sustainability, design optimization and cost savings. If you are as intrigued as we are, do not hesitate to contact us for more information.



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the power
within.●

