

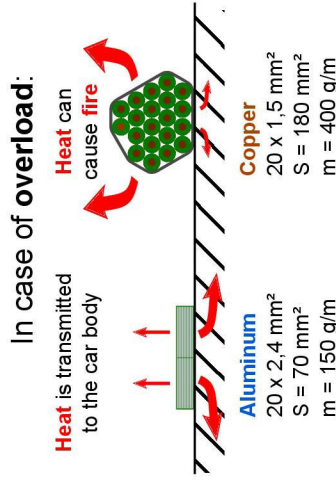
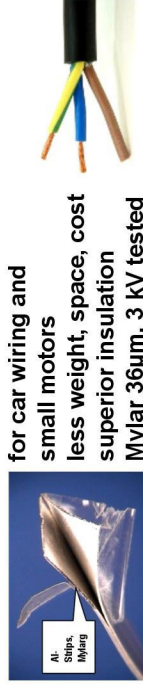


Our R&D for tomorrow's cars

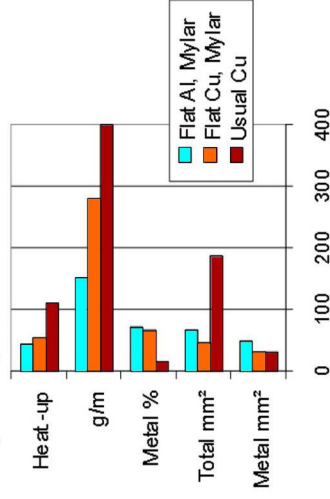
(not only cars!)

Aluminum instead of copper

Mixed car wiring
(Aluminum 85%, fixed - Copper 15%, flexible)

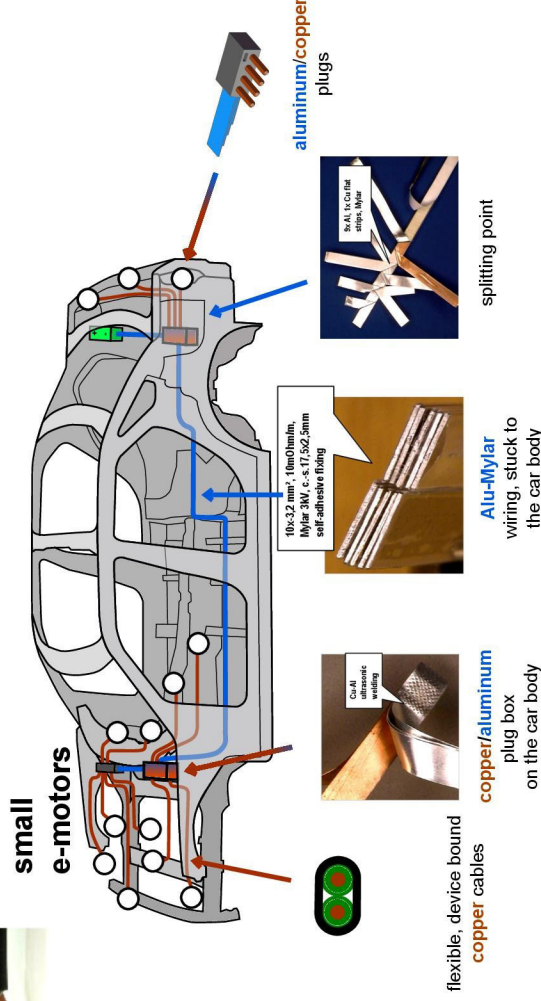


Copper- Aluminum Strip Cable
Comparison, 20 conductors x11mO/m



Quick-reaction Turbocharger

instant fuel burning to speed up the turbine
high speed multi-use air pump
emission control (secondary air pump) accessories

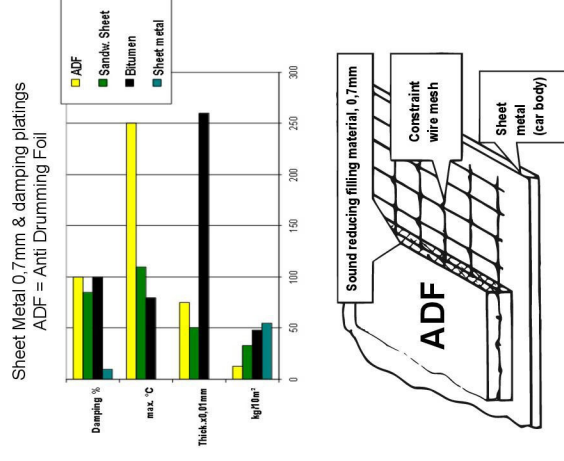


Development of small custom SR-motors brushless, high-speed, no magnets, e-bike drive, power tools



Hybrid structures

noise reduction for:
- car body surface
- hybrid housings for pumps and motors, less parts



Support and licences

invention on demand
efficient preliminary development
prototypes, testing



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ask for more info!

Take profit from our preliminary development expertise: we do it for the needs of the customers, for your exclusive products, with our technologies, covered by our intellectual property. **How we work:** from the brain to the hand at the machine, we like to build and test not virtual, but real prototypes! Our technologies:

We replace copper with aluminium for lighter, small and smart, less expensive products. This is done this by using flat conductor strips having an insulation made out of superior very thin foils, so that an insulated aluminium strip of the same conductivity will have a smaller cross section than the usual copper cable. We have developed an exclusive technology to tightly cover metal strips with e.g. Mylar, which is welded along the edge of the metal strip. Connecting copper with aluminium is not a problem by swift ultrasonic welding, as plug parts should be made out of copper alloys. Even planes have aluminium wire harness (Airbus A380), why not just stick flat aluminium strip wirings in the cars? Only a small part of the wiring harness will consist of short usual flexible copper cables pieces, directly connected to a device. Their outer end will be a plug. The biggest part of the car wiring, out of aluminium strips will be stuck on the car body, as well as properly placed plug boxes at their ends. Aluminium strip wiring will not cause fire if short circuits occur, because its thin flat insulation leads the heat much better to the car body as a heat sink. The number of plug connections will be the same. We can already produce flat insulated conductors or cables out of copper or aluminium strips as required. The indoor wiring is a very interesting application of our flat self- adhesive strip cable (the "tape cable", 16A- 0,35mm thick) which can be stuck at the wall. Tape- cables are very safe, because the protective ground (earth) covers the hot, current carrying conductors, so than contact or even piercing are less dangerous compared with conventional cables. Unhappily, actually there are not DIN- standards for such conductors. Tape cables are invisible under the wallpaper, or can pass through the door fit gap. This solution is very appealing almost for everyone, fits old or new houses as well as new markets in developing countries and would best comply with new, smart self- adhesive devices.

The turbocharger is a gas turbine (exhaust gas turbine and air compressor) which gets exhaust gases from the piston engine. If one accelerates sharply, the response of the gas turbine is unsatisfactory; this is the turbo lag. According to our solution, a small yet powerful high-speed air pump instantly supplies compressed air for the supplementary burning of a small amount of fuel, this giving additional hot gases to quickly spool- up the turbine, this boosting the intake air pressure and the engine output. The turbo lag disappears and the car speeds- up quickly. The powerful air pump can be used as a secondary air pump to reduce emissions or to cool the catalyst. The Pump can also be used for accessories, to inflate boats or cushions for lifting devices or fixation of the payloads, or as an air broom. Compared to the electrically powered compressor (supercharger) with a power consumption of 1.5-5 kW, our small, high speed air pump with Plusmotor needs only a modest current draw.

The anti-drumming foil, (ADF, start of production 2013) is a lightweight (about 1,4 kg /m²) temperature resistant (max. 250° C) self- adhesive, noise reducing, less than 1mm thick layer, which is paintable and can be used instead of the heavy usual bitumen sheets. It should be stuck on rattling metal sheet surfaces to get them quiet.

Applications: the ADF is built for noise reduction in the automotive industry and aftermarket, industrial equipment, household products, so for rattling doors, trunk lids, hoods, metal sheet coverings in the industry , sheet metal cabinets , noisy air ducts , buzzing electrical boxes, kitchen sinks, washing machines, plastic panels.

Market volume: 2-5 m² ADF/ car, for doors, hood, roof- liner, other metal surfaces.

Hybrid noise reducing structures: this new product, e.g. for housings for noisy devices can advantageously replace more complex plastic parts and is made out of a metal grid (skeleton) which is embedded in a softer, usually rubber-like mass. This constitution permits that additional parts such as rubber gaskets, elastic hinges, tight cable passages, are no longer needed, the assembly is simplified, the noise reduction excellent. The design of the inexpensive skeleton (e. g. out of perforated, deep drawn metal sheet) permits that the stiffness of the housing can be adjusted in various zones. This solution is particularly interesting for the noisy tight enclosing of small electric automotive motors or parts for the passenger cabin, with improved acoustic, having a pleasant surface feel.

We have also developed the Plusmotor, a brushless switched reluctance motor (without magnets) with inexpensive electronics. The exclusive production know- how for this is also ours.

This motor, see www.plusmotor.de is also suitable for high rotating speeds, even more than 100.000RPM and can be designed according to the customer needs, either low- profile or lengthy as usual motors. We can offer not only the design licenses, support, but also samples with their test results. We can also offer a low- cost, planetary gear technology in plastic design having extremely high gear ratio that is tailored for the Plusmotor and targets applications with low weight and high performance, as for bike drives or power tools.

The Plusmotor is suitable for large-scale automotive products, cordless tools and also for mains voltage for powerful products like vacuum cleaners and washing machines.

The highest cost savings can be reached with products like washing machine motors and vacuum cleaners, as they can be provided with our insulated aluminium strips windings.

The washing machine motors gives probably the most important material costs saving of more than 8€/motor. This new one with aluminium windings weighs only 2,5kg, instead of the usual 5 to 6kg/ motor for the usual, copper wire wound motors. As it is brushless, the Plusmotor does not need a speed sensor like the state of the art motor.