

Norderstedt, March 22, 2016

Innovations I:

Automotive business segment: powering ahead into electric mobility, a market of the future

A broad range of adhesive tapes gives full support for electric solutions

Electric vehicles have many advantages over those with combustion engines: If the battery is charged with electricity from renewable sources, electric cars run practically without any harmful emissions, plus they are very quiet. Besides that, they achieve over 90 percent efficiency – unlike combustion engines, which reach about 35 percent. What that means is that 90 percent of the electric power used can be converted into mechanical force, and thus propulsion, right from the very first revolution. Although electric vehicles are still viewed as somewhat exotic in Germany, where there are about 19,000 of them registered (worldwide: 740,000), the German federal government's "electromobility" program has set ambitious goals: By 2030, the plans call for there to be six million electric vehicles on Germany's roads. Experts forecast that global sales of electric vehicles will reach about 459 billion euros in 2030 (source: statista, 2016).

Special tapes for electric and hybrid vehicles

Reduce prices and weight – and drive farther. That's the "magic triangle" for automotive manufacturers and their suppliers when it comes to electric mobility. According to a recent study titled "E-Drive Batteries 2025", conducted by corporate consulting firm A.T. Kearney (Düsseldorf), the prices of batteries for electric vehicles will decrease by more than half between now and 2025. Alongside the batteries, which are a crucial factor in determining the vehicle's range and cost, vehicle weight – everything from the body to the interior – plays an important role as well. As a result, carbon fiber composite materials are increasingly in use, for example. And so are adhesive tapes, which are not as heavy as traditional joining materials like rivets and screws. In addition, many technologically advanced tapes perform additional functions. tesa SE, which has partnered with the global automotive industry for

many decades now, recently launched new adhesive tapes for electric and hybrid vehicles on the market in close cooperation with the OEMs and their suppliers.

Preventing power surges and fires

An electric car's battery is a highly complex construct. It typically consists of cells measuring 100 by 200 millimeters, assembled into modules of ten cells each. Ten modules – 100 cells in all – then form the battery block. Each cell generates heat and electrical voltage that needs to be shielded. tesa plays an important role in this context. Double-sided adhesive tape and a special film are used to connect the cells with each other and insulate them so that no power surges, known as "overvoltage," can occur. The battery can be wrapped in other products from the tesa range that are non-flammable and withstand temperatures of up to 150 degrees Celsius. Right now, for example, a major Chinese battery manufacturer uses a kind of tesa tape that wraps around the entire block.

Leading the world in wire harnessing

Another important field of application is system solutions to protect and affix wire harnesses (wire harnessing). tesa is among the most important providers worldwide in this market segment, with a wide range of products that customers can order on rolls or in highly flexible sleeve form as needed. Depending on the intended use, these tapes are required to be extremely resistant to abrasion, extreme temperatures, and chemicals while also damping noise. In 2014, tesa was awarded a patent for an orange adhesive tape that is used in hybrid vehicles and has now been certified by all of the well-known American and European OEMs. The background is that all cables and bundles of cables with voltages over 60 volts are required by law to be marked in orange as a signal color. Before this tape was patented, however, there were no adhesive tapes anywhere in the entire global "automotive world" whose color did not fade at temperatures of 125 to 150 degrees Celsius when tested for 3,000 hours. This fading could put firefighters in acute danger when salvaging a car after an accident, for example. The new tesa® 51036 in orange now sends one message loud and clear for a vehicle's entire lifespan: Do not cut this cable!

Lightweight hole covers reduce weight

At first, it might be astonishing to hear that automotive manufacturers that produce vehicles weighing upwards of a ton ask their suppliers to exhaust every avenue of potential for reducing weight, no matter how small the savings. But especially in light of the issues surrounding vehicle range, the motto is that every gram counts. From the floor to the wheel arch and from the engine compartment to the doors, numerous vehicle body parts are manufactured with holes that make it easier to dip-paint them. However, these holes need to be covered later on in the production process so that they do not allow either moisture or dirt to enter the vehicle. If adhesive die-cuts from tesa are used instead of conventional plastic parts to cover the average of 72 holes in a vehicle, that reduces the weight from 281 grams to 42 – an 85 percent savings.

Synergies between automotive and electronics

The electronics sector is becoming a major competitive factor in cars, as elsewhere, with the value chains of the two industries becoming increasingly interconnected in terms of production. Consumer wishes and legal requirements are progressively making electronic assistance systems a standard item. These systems are controlled via touchscreen, like tablets or navigation devices, and the speedometer landscape is dominated by digital displays. The components of these onboard electronics are held in place with tape – and tesa plays an important role there, too. “We have decades of expertise in both the automotive and electronics industries. We are benefiting from that now,” says Dr. Robert Gereke, CEO of tesa. “With our technologically advanced functional adhesive tapes, including electrically conductive tapes (ECTs), optically clear adhesive tapes (OCAs), and barrier tapes for applications in curved displays, we are in an excellent position for the future of automotive manufacturing,” he explains. In all, more than 75 different adhesive tape applications from tesa can be installed in a new car – regardless of whether it is powered by gas or a battery.

Looking back: An electric tricycle taught cars to drive

In 1886, newspapers all over the world reported on what was then the biggest revolution ever to occur in mobility: 130 years ago, the automobile was born. On January 29 of that year, Carl Benz, a German engineer, applied for a patent for his “vehicle with gas engine

operation,” and in July, the three-wheeled Benz patent motor car type 1 appeared on its first public drive, to widespread acclaim. The story is a familiar one. But it could also be told from a different angle, as the triumphant rise of the automobile started with electric vehicles. Back in 1881, five years before legendary automotive pioneer Benz, Gustave Trouvé was driving a quiet electrically powered tricycle through the streets of Paris. In 1899, it was “La Jamais Contente” (“The Never Satisfied”) from Belgian designer Camille Jenatzky that was the first car in the world to reach speeds of 100 kilometers per hour – driven by electricity alone. And in 1900, about 75 factories in the United States produced 4,192 automobiles in all, 1,688 of them powered by steam and 1,575 by electricity, with just 929 with gasoline engines. The discovery of increasing numbers of new oil wells, the rapid evolution of combustion engines, inexpensive mass production, and the positive image enjoyed back then by loud gas-driven vehicles, which stood for power and progress, largely pushed electric vehicles aside. People did not start to reconsider this until the 1970s, when soaring crude oil prices sparked an oil crisis and brought recession in industrialized countries, making it clear that oil was a resource that would soon be exhausted. Then, in the 1990s, climate change – with increasing burning of fossil fuels and the attendant large-scale CO₂ emissions as the main culprit – brought electric cars back onto the road.

This press release, along with image and photo materials, is available online at www.tesa.com/press.

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