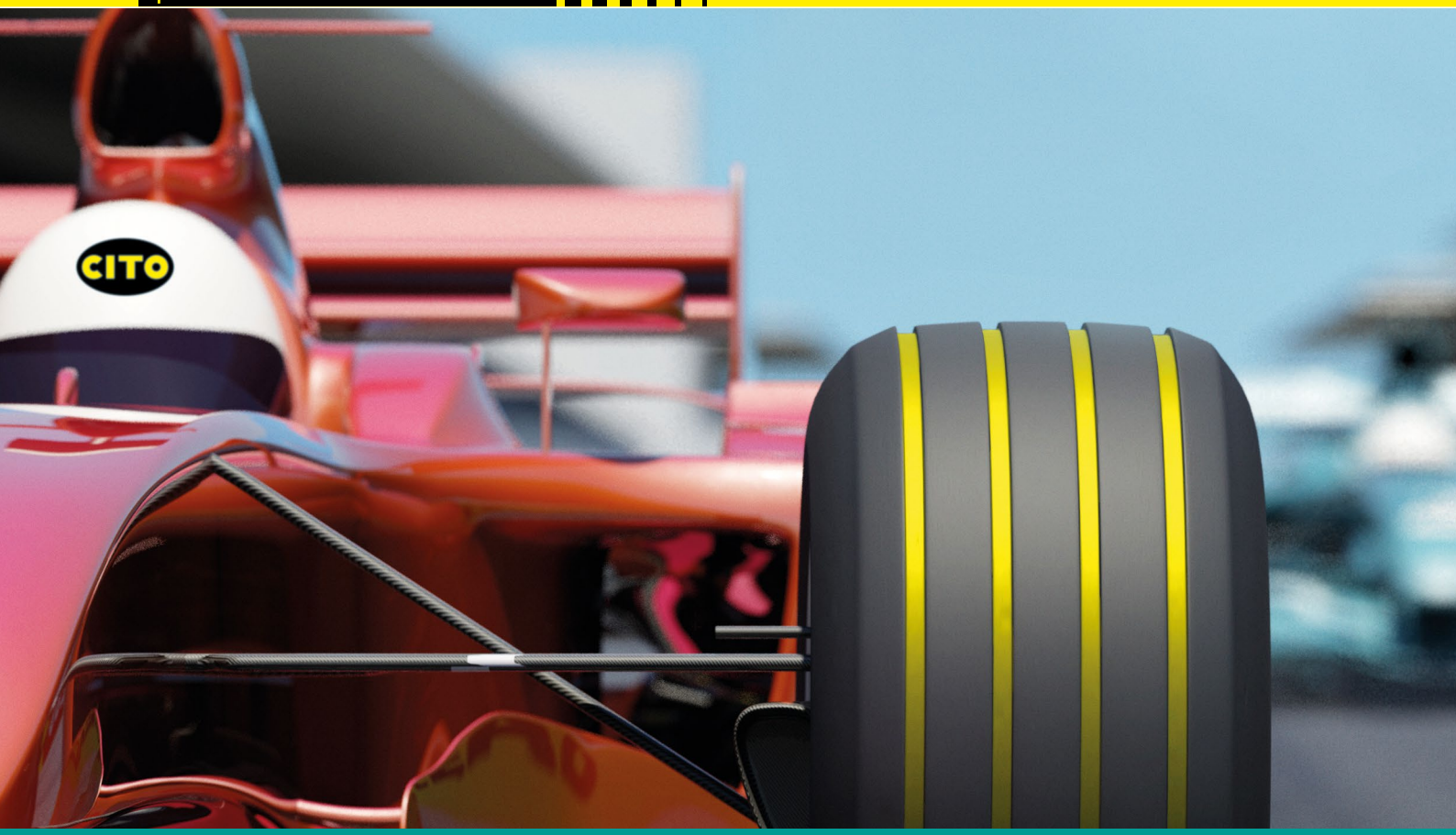


How high-quality materials reduce diecutting costs

Rubber makes the champions

Modern day reports on Formula 1 racing discuss the tyres more than the engines, aerodynamics or even the drivers. Why? It's quite simple: the specialists know that the condition of the tyres decides whether a race can be won or not. So what has that got to do with us? The question about the situation of the rubber on the cutting die leads to exactly the same statement: "Rubber makes the champions".

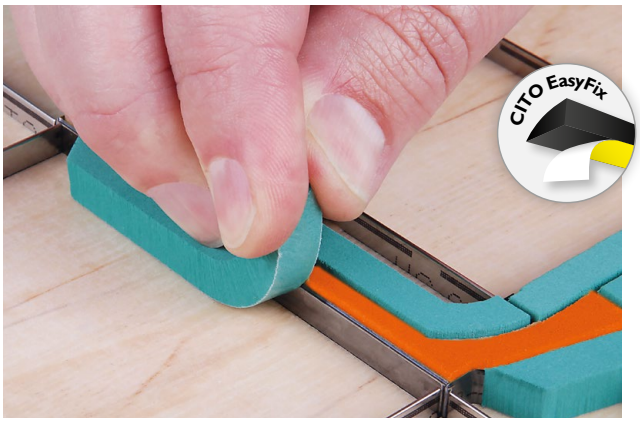
A Formula 1 racer without high-tech tyres makes no sense, and the same applies to a cutting die with poor rubbering. The performance of your diecutting machines is highly dependent on the quality of the cutting die, and this in turn is substantially dependent on the type of rubbering ejection material. In the past, it was worked with machines that achieved an output of 4,000 to 5,000 sheets per hour. Nowadays, up to 11,000 sheets per hour are expected. It is quite clear that twice the productivity cannot be achieved with outdated tooling and substandard rubbering. Mechanical engineers can build diecutting machines, in which two tool tables move towards each other at high speed. The problem in our industry is that we place board and paper between these tool tables. Materials that pose new challenges for us again and again. There is simply no consistency in this material. This is why it is absolutely necessary to avoid any further fluctuations in the tools used.

In the past, most rubbering materials used were neither developed for their purpose nor are they physically suitable for such use. In general, the material is intended for use as insulation and shock absorption. Sponge rubber is still widely used; a material with largely uncontrolled pores of different size. Sponge rubber is mainly used for sealing purposes. Propellant gas is widely used in its production. The use of EPDM is also widespread. It was also developed as a sealant against moisture. The list could be continued ad infinitum because, in the past, the ejection materials for cutting dies were chosen rather for cost reasons than for their technical and physical suitability. A development, for which the paper processing industry is not fully blameless. Because increasing price pressure on the tool producers automatically led to them searching for even cheaper materials. In the case of cutting rules made of steel, all stakeholders have long since recognised that the use of cheap rules does not pay. At least in the industrial countries, quality rules with high consistency and durability are now used. In the case of rubbering, we are still far from achieving such standards.

Repeatable precise compression behaviour

Is there such a thing as an ejection material that was developed especially for use on cutting dies? Luckily, this question can be answered with a clear Yes! Examples are CITOject F and the high-end product Polytop MX®. Their physical and mechanical properties, such as repeatable precise compression behaviour with maximum consistency and speed, meet the challenges faced in the cutting process. Hysteresis tests demonstrate the frequency with which the material restores itself to its exact original height after compression. Speeds of up to 5 Hz, equivalent to a real speed of around 18,000 sheets per hour, are achieved. Another important issue is how long the material returns to its original height. Tests of the named products have shown that the physical and mechanical properties remain constant for more than 5 million compressions. The life of these materials therefore far exceeds the tool life of cutting rules made of steel.

What else has to be considered when choosing the rubbering for the cutting die? A clear colour code, with which it can be immediately and easily checked whether the right ejector is installed in the right place. Here it is not a matter of using the company colour of the respective tool manufacturer in the colour of the ejection materials. The purpose of the colour code is to enable fast and easy checking, to avoid the installation of poor quality tools in the machine from the outset.



Residue-free removal with EasyFix technology

Influence on the necessary cutting pressure

The ejection material also has an enormous influence on the necessary cutting pressure. Conventional products, which were not developed for the cutting process, do not take this into account at all. The wrong material on the cutting die makes higher cutting pressure necessary. This impacts the diecutting machines and thus also the tool. In simple terms: An extremely high cutting pressure means unnecessary cost. It is important to ensure that complete systems are used for the rubbering. Such a system not only includes using the right high-quality material, but also the assembly system, with which the appropriate material is mounted on the cutting die.

Self-adhesive EasyFix technology with fingerlift

Such systems can be identified by the name "EasyFix". EasyFix is not simply a self-adhesive tape. In addition to the material for the general rubbering uses, appropriate special profiles also exist for special tasks on the cutting die. Here it is essential for the gluing technique to be precisely matched to the mechanical impact of the process. Because, depending on their use, shear or peeling forces act on the ejection materials. It is definitely an advantage if profiles are equipped with a fingerlift system. This simplifies the detaching of the protective paper from the glue enormously and this in turn has a positive effect on the gumming process.

Certified material on flatbed cutting die

Food compatible production

Packaging producers are now confronted by the topic of food compatible production more than ever before. Here it is also important to be able to count on a system supplier. In the cutting process, even if for a very short time only, the ejection material comes into contact with the board or paper. After the ejection materials have been produced in a chemical process, so-called migration of chemical particles into the board or paper could occur here. To avoid this risk, it is important for the whole system, including the adhesive, to have a food safety certificate. A confirmation that the raw material is safe, is nonsense. So-called cyanoacrylate adhesives are still commonly used to mount profiles. Colloquially, such adhesives are mostly known by their brand names, such as "superglue", or "Krazy Glue" in the USA. From their own experience, most people know that such adhesives are anything but safe. For this reason it is important that the cutting die is only equipped with safe products; it's no use if a cutting die is produced with only 80 % certified products. The remaining 20 % causes the whole cutting die to lose its safety rating for contact with food packaging. A clear demonstration of food safety is ISEGA certification. However, as already explained, only if the whole system is certified.

Summarising this article: Opt for a partner who is an expert in the topic, has their own development department and their own chemistry laboratory. Nowadays, it is no longer useful to simply purchase any materials, apply an arbitrary adhesive and then sell them on. Anyone who underestimates the topic of "rubber" ejection material ultimately pays a high price. Poor productivity, increased process costs and problems in further processing are the consequences. Talking of price: A good tool has a value and in most cases, it is far cleverer to pay a bit more for a good tool than to throw away profit on higher production costs, longer throughput times and the dissatisfaction of your customers. In general, tool costs account for less than 2 % of total production costs. A few additional euros invested in quality tools produce a significant payback in your production costs and generate a better profit. "Rubber makes the champions."

Jürgen Mariën