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Solid and flexible: With the newly-developed “Solidflex” material grade, thyssenkrupp Packaging Steel further optimizes steel packaging

A small part that can do a lot is the rivet, e.g. on a can: it connects the tear-off ring to the lid. This metal part has to be soft and flexible in order to press the ring upward, yet at the same time hard and solid, so that the connection to the lid holds. These stresses present a special challenge for the material used. thyssenkrupp Packaging Steel has now developed an improved solution. With “Solidflex,” the packaging steel specialists in Andernach have succeeded in further optimizing the proven grade “DR formable.” DR (double reduced), already stands for the special hardness of the material. “By increasing the hardness still more, we can make available a packaging steel that has a tensile strength of 700 MegaPascals instead of the previous 580 - and this with not just an equivalent, but rather with an extended elongation between 5 and 10%,” explains Dr. Burkhard Kaup, Manager of Material Technology at thyssenkrupp Packaging Steel.

Stability and resilience are the actual strengths of packaging steel. They guarantee the great protective effect of packaging with a low empty weight for many years and under a wide variety of environmental influences. In addition to good stackability and resistance to breakage, state-of-the-art packaging also requires high degrees of formability and precisely-adjusted properties, for example to make opening the can easier for the user. At the same time, the material should be used ever more efficiently. thyssenkrupp has made the optimal combination of these contrary properties with one another its task - and the result is “Solidflex.”

“Solidflex is the latest example of our constant search for advantages for our customers. In further processing, Solidflex also increases process reliability and product quality. The greater material efficiency also helps reduce costs and thus provides our customers with a competitive advantage,” adds Dr. Peter Biele, CEO of thyssenkrupp Packaging Steel in his comments about this new development.

One the one hand, the combination of properties achieved with “Solidflex” enables the thickness of the material to be reduced with at least the same properties of the final product; on the other hand, the expansion of the room for play for the usage and handling of the package. With a full tear-off lid, for example, great stability is the necessary prerequisite for the pressure stability of the container, while the elongation, that is, the formability, must be proven with the formation of the rivet. This rivet, which connects the tear-off ring to the lid, is made from the mass of the lid material. Another advantage is that the great hardness of the material also influences the tear-off behaviour on the lid rivet. Thus the user's application of force is reduced. A thickness reduction to 0.18 mm instead of the previous 0.21 mm with diameters greater than 73 mm is possible with the new grade. With a diameter of the lid of 73 mm, a further reduction to 0.16 mm instead of the current 0.18 mm is also possible. Additional applications that can profit from the additional potential are the bottoms and domes of aerosol containers and conveyor chains.

Developing a material such as “Solidflex” requires close coordination of the process steps, both during steel manufacturing and tinplate manufacturing, for these processes frequently mutually affect the material properties. For Dr. Helmut Oberhoffer, Research Director at thyssenkrupp Packaging Steel, the company-wide cooperation is crucial for success: “On the one hand, we profit extraordinarily from the concentration on a single location. In Andernach, we can conduct experiments under close-to-production operations and at the same time check the industrial feasibility. On the other hand, in close cooperation with the steel production of thyssenkrupp Steel Europe, we have extraordinarily deep expertise, which, for example, guarantees the extremely high purity of the basic materials.”

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