

## A single process for sealing, embossing, and punching

Ultrasonics for tubular bag packaging

PLASTIC WELDING

METAL WELDING

CUTTING

CLEANING

SCREENING



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Tubular bags are ideal for enveloping and protecting all kinds of products, from bulk goods and liquids through to technical products and toys. They offer a kind of packaging that is easy to handle, uses very little material, and is widely recyclable. Not only that, but ultrasonic welding provides a fast and impermeable seal that protects the products inside. Ultrasonic technology even holds another advantage in that it is also suitable for cutting, which means that punching, embossing, and sealing can be combined in a single process – so a euro hole can be created while sealing is taking place, for instance. This in turn allows the bags to be presented attractively at points of sale without the need for any additional hanging features like cardboard tabs.

The term “ultrasonics” is used to describe sound frequencies above the human hearing threshold; that is, above around 20 kHz. Frequencies in the range of 35 kHz are used for cutting and welding. They are produced by a piezo-converter that causes a sonotrode to vibrate at high frequency, which is particularly effective in resonance yet requires little power at the same time. Clean cuts and strong bonded joints can be produced without exposing either the product or its environment to high thermal stress.

### A single solution for joining and cutting

During joining or welding, acoustic vibration sets the molecules of the parts to be connected in vibration, generating heat that breaks the material boundaries at the points of contact and fuses the materials together. The high-strength sealing seams created using this method are not only secure, but also very slim, saving on both materials and costs. What’s more, any residual product is consistently forced out of the seam during the process, avoiding any gaps in the seal. If all that



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weren't enough, ultrasonic technology is a fast method with short cycle times, is able to process all kinds of plastics – including compostable biomaterials – and has welding parameters that are easy to adjust.

Ultrasonic sonotrodes are also able to cut, which means that one tool is all that is required for sealing, embossing, and punching. With the smooth, clean edges it produces, ultrasonic technology offers real advantages during punching and cutting work, too. There is no material lost and, unlike laser cutting, the technology produces no combustion gases that then need to be extracted. For Roland A. Schierle, CEO and owner of PAXMATIC AG in the Swiss area of Haldenstein, the benefits of ultrasonic technology are clear: "We began working with Telsonic AG back in 2011 because we wanted to improve our tubular bag machines. With its input, we were then able to develop an ultrasonic unit tailored specifically to our application, and have it patented."

### An appealing way of presenting toys to encourage sales

Today, the patented unit is used in tubular bag machines across the world. In just one process, it seals the bags that are automatically fed through to it and punches the euro hole for hanging up the packaging at the same time. "The result is a highly appealing point-of-sale bag – and there's nothing else like it on the market," says a delighted Schierle. During the sealing process, the seam – which is relatively wide at around 6mm – is embossed with a special structure that makes the bag extra-stable.

Playmobil manufacturer geobra Brandstätter is one example of a company that has begun using numerous PAXMATIC ultrasonic tubular bag machines to package small toy figures at its production sites. Made of metallized polyethylene terephthalate, the printed bags it uses are both sturdy and visually appealing – ideal for presenting products prominently on store shelving.

### Long tool service life

The ultrasonic welding system is made up of a generator that produces the ultrasonic source and a converter that uses piezo-ceramic components to convert the ultrasonic source into mechanical vibrations. These vibrations are then amplified by a booster and transmitted to the cut'n'seal sonotrode. Three anvils act as counter-tools to the sonotrode: one for punching the euro hole, a second for sealing the top seam across the packaging, and a third for sealing the bottom seam. "As mechanical engineering experts, we love how long-lasting these sonotrodes are," adds Schierle. "They're able to complete well over a million cycles."

A MAG generator creates the 35 kHz ultrasonic source for the sonotrode. With a functional design that develops very little heat, it is firmly up to the challenges presented in today's plant engineering environments. The generator can be controlled with analog or digital signals, and the converter communicates with the PAXMATIC tubular bag machine via a digital interface – but is also compatible with all other standard fieldbus systems. The welding parameters are easy to adjust on the machine terminal as necessary.

Since its introduction, the patented ultrasonic unit has proven its credentials in applications worldwide – evidence that it is always worthwhile enlisting an ultrasonic specialist early on in the design stage to ensure that the right solution is found for the product-specific joining zone.

by Carolin Reinbold, Key Account Manager Packaging at Telsonic AG



04 The tubular bag film is fed in automatically

05 The welding parameters are adjusted on the machine's operating terminal