

## 7 Reasons to Reconsider Ultrasonic Sealing for Your VFFS Bagging Line

Bill Aurand, Sonics & Materials, Inc.

In recent years, many companies have begun to consider converting their VFFS bagging machines from heat sealing to ultrasonic sealing technology. The idea of reducing film consumption by narrowing the seal width is a common driver toward ultrasonic sealing. Another is the understanding that an occasional lettuce leaf or piece of cheese that gets caught in the seal area will no longer present a problem because the ultrasonic system will seal right through the product. While these are good reasons to consider ultrasonic sealing, a more thorough evaluation reveals even greater benefits. Below is a list of advantages that should be investigated when considering the switch to ultrasonic sealing technology.

### 1 - Reduced film cost

With ultrasonics, the seal thickness is typically reduced to 2mm or less. In one large-scale study, cross seal thickness reduction resulted in an 11% film savings according to a large CPG in the snack food market. See illustration below (© EWI. Image used with permission)



- In addition to narrowing the seal, ultrasonic technology can provide additional film savings by allowing the same volume of product to be contained in a smaller package. The smaller bag is made possible because head space can be reduced without concern for product in the seal area. The overall bag size can potentially be reduced by as much as 20%, depending upon the product being packaged. In some cases, zero head space packaging is possible.
- Simpler, less costly film structures can be considered. Ultrasonic sealing can be used without a sealant layer in some cases. To date, evaluation of ultrasonic technology has primarily been done on films designed for heat sealing. When film suppliers begin developing products specifically for ultrasonic technology, even greater savings will be realized.

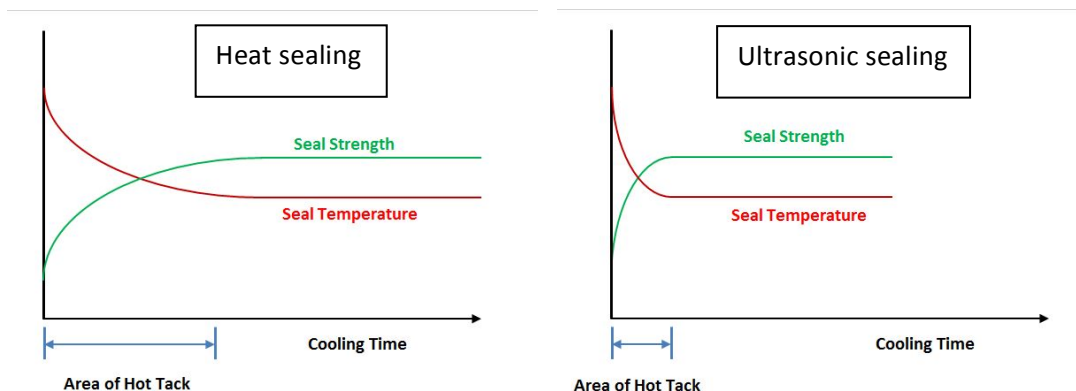
## 2 - Less wasted product

- The ability to seal through contamination means waste is no longer generated when internal product hangs up in the seal area. Not only does this enhance the process at the bagger, it further reduces waste downstream. Faulty seals created with heat sealing may not be discovered until they have damaged dozens of other packages during shipment.
- Fewer overall rejects means more product out the door. It is not uncommon for ultrasonic sealing to see reject rates as low as 1:100,000 seals. Of course this varies with film type and product being packaged, but once the ultrasonic process is optimized, there is no better way to guarantee high quality hermetic seals.

## 3 - Enhanced throughput

Rather than simply comparing heat seal times versus ultrasonic seal times, CPGs should consider total productivity. Seal time alone does not dictate output. Actual ultrasonic seal times are usually very similar to heat sealing times. The increase in productivity is due to other reasons. Also factor in the following:

- Higher throughput due to reduced concerns over product in the seal area. Because ultrasonic tools can seal through product contamination, less time is required to wait for product to fall clear of the seal jaws. Therefore the machine can safely be set to run at a faster rate.
- Increased machine speeds due to the elimination of hot tack concerns. When bagging heavier products, residual heat in the seals can cause package failures unless the machine is slowed down to allow the seals to cool. Ultrasonic sealing does not have hot tack issues because the tools remain cool and less overall heat has been applied to the film. Ultrasonic seals exhibit full strength almost immediately. See illustration below.



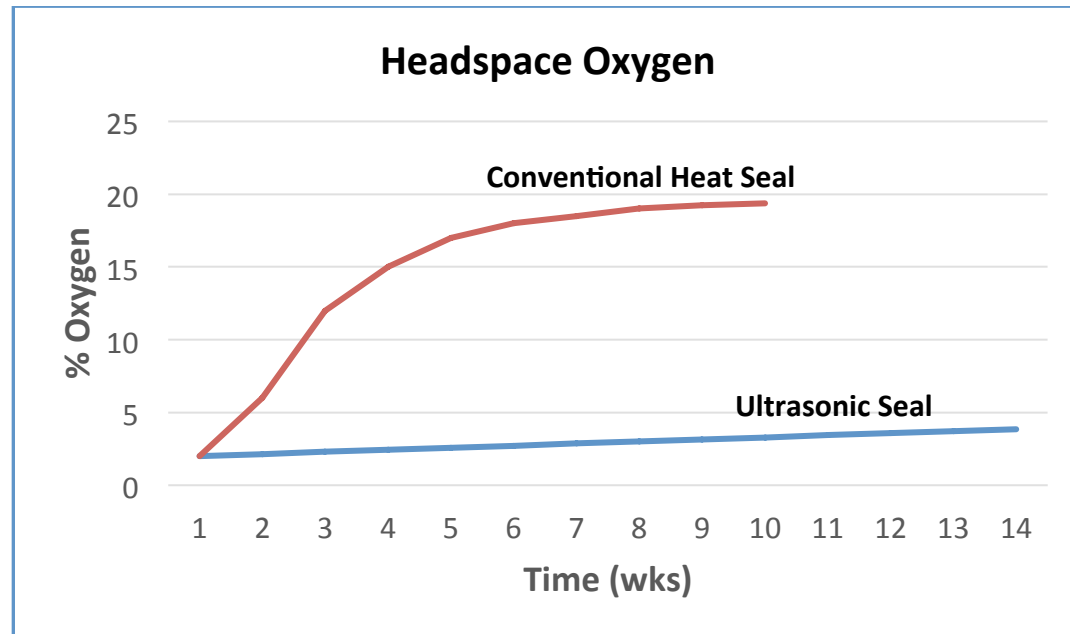
- Productivity is further increased with ultrasonic technology because the process does not require any warm up time. The first bag of the day from an ultrasonic VFFS system is perfect. Typical heat seal jaws can require up to 15 minutes of warmup time. 15 minutes @ 80 bags per minute = 1200 additional bags produced using ultrasonics each time the machine is started up.

## 4 - Improved product quality.

While this should be a primary driver, strangely the product quality enhancements are rarely fully evaluated by CPGs. Consider the following:

- Ultrasonic seals on average are 'tighter' and more hermetic than heat seals. As a result of better seal quality, the reduction in Oxygen transmission rate with ultrasonic sealing is dramatic. Nitrogen

flush is maintained for many months versus a few weeks with heat sealing. This results in fresher products with much longer shelf life. See illustration below (© EWI. Image used with permission)



- Further, when ultrasonic technology is used on VFFS baggers, hermetic seals are created even when the film is creased, making the entire process much more forgiving and productive.

#### 5 - Enhanced safety and maintenance

- Based on an extended study done at a large CPG facility, maintenance personnel were strongly in favor of ultrasonic sealing over heat because there are no issues with burns when working with ultrasonic systems. Once powered down, it is completely safe to handle the ultrasonic tools.
- In addition, heat sealing tools can be time consuming to clean due to the internal product and film becoming baked on over time. Because ultrasonic tools stay cool, they are much easier to clean.

#### 6 - Reduced energy consumption

- Heat sealing draws significant electrical current during the entire shift to maintain the set seal temperature within the jaws. Ultrasonic technology is an On/Off process, meaning the system draws essentially no electricity except during the actual programmed seal time. With seal times as fast as 100 milliseconds, it is easy to see how ultrasonic technology can provide energy savings.

#### 7 – Ultrasonic sealing is an 'intelligent' process

- In today's manufacturing world, blind processes can no longer be tolerated. With heat sealing technology, operators have no way of knowing whether any specific bag was sealed properly or even under the same conditions as the next. Ultrasonic sealing provides intelligence to the process by allowing parameters such as seal time, peak power draw and the actual energy delivered into each cross seal to be monitored. This data can then be used to track the process or even divert suspect bags for testing.

We hope the list above will give you a better understanding of what ultrasonic sealing technology can bring to your packaging operation. Clearly, ultrasonics can offer far more to the bagging process than merely narrowing the seal thickness or cutting through an occasional lettuce leaf. Unfortunately, many of the other benefits can be difficult to quantify until the process has been in use for a period of time. Without full knowledge of all of the advantages offered by ultrasonic sealing, many CPGs make their decision based on only the tangible material. This fact, combined with the historically high cost and complexity of integrating ultrasonics explains why ultrasonic sealing isn't currently being used by everyone. The good news is that improvements in ultrasonic equipment technology as well as recent advances in applications provide even more reasons to reinvestigate this beneficial process.

- The cost of ultrasonic equipment is not as high as you may have been lead to believe. Complete component systems can now be delivered at a fraction of the cost of what was typical just a few years ago. In fact, even turnkey ultrasonic conversions for used bagging equipment are now a cost effective option.
- Beyond being more affordable, it should be noted that the complexity of current ultrasonic sealing systems is not what it was in the past. Today's modern single converter drive ultrasonic systems are far simpler, more user friendly and more robust than outdated 'twin stack' designs.
- In addition, recent breakthroughs in seal bead geometry now enable ultrasonic sealing to be used in gusset applications. Strong, hermetic ultrasonic seals across the transition from 4 layers of film to 2 layers are now possible. This opens up the possibility for ultrasonics to be applied in applications such as gusset bag cross seals and side seals for standup pouches produced on VFFS machinery.

With so much to be gained by using ultrasonic sealing, and the technological advancements in today's modern ultrasonic packaging systems, there are compelling reasons to give ultrasonic sealing a second (and closer) look.

#### About the author

Bill Aurand is the Packaging Technology Manager for Sonics & Materials, Inc. He began his career in ultrasonics in 1985 as an Ultrasonic Welding Applications Engineer immediately following his college education. Since then Bill has held various management level positions within several American and European ultrasonic equipment manufacturers. Throughout his career, Mr. Aurand has been responsible for providing educational seminars on ultrasonic technology both domestically and internationally for internal employees, customers, University students and local SPE and SPI chapters. Bill's market emphasis shifted from rigid plastic part assembly to flexible packaging in 2010 as new innovations in ultrasonic technology allowed it to be successfully applied in applications that had previously been avoided. In 2013, Bill was a guest speaker on *Recent Advancements in Ultrasonic Film Sealing* at the ANTEC convention in Cincinnati, OH. Bill was also a guest presenter on *Understanding Ultrasonic Film Sealing, Its Benefits and Limitations* at the Global Pouch Forum West, 2014.

**Sonics & Materials, Inc., 53 Church Hill Road, Newtown, CT 06470, USA**  
**Phone: (203) 270-4600, Fax: (203) 270-4610, Toll Free in USA: (800) 745-1105**  
**Email: [info@sonics.com](mailto:info@sonics.com) Web: [www.sonics.com](http://www.sonics.com)**

Sonics and Sonics & Materials are registered in U.S. Patent and Trademark Office.