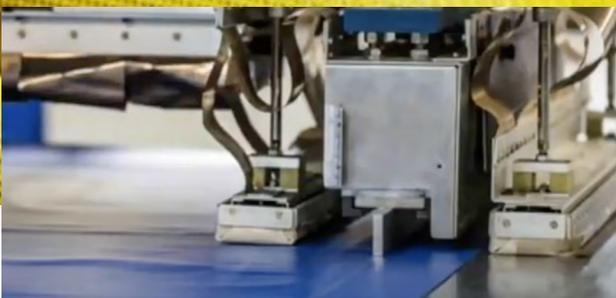


# THE ULTIMATE GUIDE TO RF WELDING PROCESS



**CAROLINA  
COVERTECH**



# THE RF WELDING PROCESS

Although there are many techniques for joining sheets of PVC, vinyl, and other plastics, few create as durable a seal as radio frequency (RF) welding. RF welding is an effective alternative to sewing, gluing, and hot air melting or welding, creating an even and lasting seal between plastic materials.

In this eBook, we'll cover everything you need to know about RF welding to help you decide whether this technique would benefit your application.

WHAT IS RF WELDING

THE RF WELDING PROCESS

WHY USE RF WELDING

RF WELDING APPLICATIONS



## WHAT IS RF WELDING?

RF welding, sometimes called RF heat sealing, applies energy at or near radio frequencies to melt plastics together. Radio waves sit above audible frequencies and below infrared frequencies on the electromagnetic spectrum. In RF welding, a sealing machine directs these waves at the plastic, heating it to its melting point. Throughout the process, the plastic sits enclosed in a compression mold to ensure that the final cooled shape is correct.

Like microwave ovens, RF welding leverages dielectric heating to excite molecules, which produces heat. Because dielectric heating is only effective on materials with dipoles, or uneven electric charges, RF welding is only compatible with certain plastics such as PVC, nylon, and polyurethane.

# THE RF WELDING PROCESS

The RF welding process is quick and energy-efficient. First, an operator loads the material onto a sealing die and closes the die with a predetermined amount of clamp pressure. Next, the operator turns on the RF power, which creates the electric field and forces the plastics, which are still under pressure, to melt into one another. By maintaining heat and pressure, the operator ensures that the polymers fully merge with one another, creating a complete seal. After a cool cycle, the sealing pressure releases, and an operator removes the welded product.

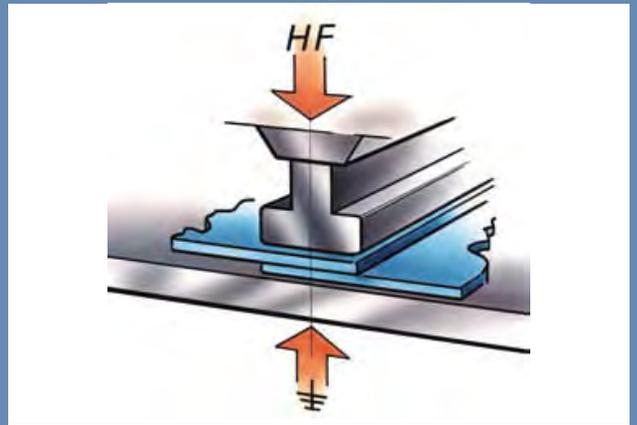


## KEY CONSIDERATIONS IN THE RF WELDING PROCESS

Several key variables influence the result of RF welding. Working with an experienced contract manufacturer ensures that these variables will be set appropriately for your application.

## COMPRESSION FORCE.

The RF welding press applies a configurable amount of pressure to the melting plastic. The greater the seal pressure, the larger the area of the seal.



## SEALING POWER.

The amount of power applied in RF welding varies with the die's surface area and the plastic's properties. The operator must ensure that the equipment provides appropriate sealing power for the given material thickness and seal area.

## SEAL TIME.

**There are three phases of an RF sealing process:** pre-seal, main seal, and cooling. All of these timers should be precisely regulated to ensure that the material spends sufficient time pre-heating and cooling. Inaccuracies in any of these three process times can harm the ultimate seal quality. Insufficient cool time can be especially problematic if the press retracts before the plastics have solidified.



An experienced manufacturer will understand how to set these parameters to achieve optimal results for each project. They will also be able to account for variables such as starting temperature and environmental humidity, which can impact the ideal settings day-to-day.

# WHY USE RF WELDING?

RF welding provides unique benefits compared to other common sealing methods. Since RF welding melds the polymers together from the inside out, it creates the most durable, air-tight seal possible. On the whole, the process is also fast and energy-efficient, and automation can decrease lead times even further.

## RF WELDING VS. SEWING

Industrial sewing joins two materials together with strong, tightly woven seams. However, no matter how high-quality the stitching, threads are still prone to breakage when exposed to high pressure, and the bind can become weaker over time. By contrast, RF welding melts plastic materials into one another so that they won't split under pressure. Other benefits of RF welding vs. sewing include RF welding's ability to create a completely airtight seal, which is impossible with sewing, and distribute pressure more evenly across the product's seams.



## RF WELDING VS. GLUING / ADHESIVES

Specialized adhesives can create powerful, air-tight seals between plastic sheets, but the seals are only as strong as the adhesives. As the glue degrades, the bond weakens, and the seam eventually fails. RF-welded seams aren't subject to the same kind of wear. Gluing is also a more labor-intensive process than RF welding, and it uses toxic solvents that RF welding avoids.



# WHY USE RF WELDING? CONTINUED...

## RF WELDING VS. HOT AIR

Like RF welding, hot air welding also involves melting plastics into one another to permanently seal them together. However, RF welding works on thicker materials, whereas hot air cannot penetrate to the core of very thick plastic sheets. Using hot air on materials that are too thick leads to a weak seam with overheated surfaces. Radio waves, on the other hand, easily and evenly penetrate the entire material, creating a higher-quality seal.



The team at Carolina CoverTech can help you determine whether RF sealing is the right fit for your application.

# RF WELDING APPLICATIONS

RF welding can seal plasticized sheets for virtually any application, working with both thin sheets and thicker, industrial-strength materials. RF welding can join the edges of a binder, the seams of a blood pressure cuff, or the linings of an airbed or inflatable boat. RF welding is especially useful for creating air-tight, water-tight seals for tarps, linings, and equipment covers.

AT CAROLINA COVERTECH, WE SPECIALIZE IN HIGH-PERFORMANCE COVERINGS AND CONTAINERS, BUT WE ALSO APPLY OUR EXTENSIVE RF WELDING EXPERIENCE TO ADJACENT PLASTIC APPLICATIONS. SOME OF OUR CAPABILITIES INCLUDE:

- **BERMS**
- **MEDICAL DEVICES**
- **SPILL CONTAINMENT & DIVERSION**
- **INFLATABLES**
- **INDUSTRIAL CONTAINERS**
- **CANVAS, POLYETHYLENE, & VINYL BAGS**
- **VEHICLE COVERS**
- **CAMPING EQUIPMENT & SUPPLIES**
- **LINERS**
- **CURTAINS**
- **TARPS & DURATARP**
- **ROLL-UP DOORS**
- **BLADDERS**
- **ENCLOSURES**

Whether your project is on the list or something completely new, we are excited to develop a solution that meets your needs. We've been in business since 1858, and in that time, we've fulfilled orders ranging from standard designs to seemingly impossible innovations. Whatever your ideas, we're ready to hear them.

# CAROLINA COVERTECH'S RF WELDING SERVICES

Carolina CoverTech is a vertically integrated company specializing in plastic products that cover, protect, or enclose. Our products are durable, flexible, and weather-resistant, and thanks to powerful RF sealing, they can be made completely air- and water-tight.

To learn more about how RF welding compares to industrial sewing and other fabrication methods, or to inquire about Carolina CoverTech's premium capabilities, [contact](#) our team today.



# ABOUT CAROLINA COVERTECH

Carolina Covertech is a contract manufacturer that helps in the development and manufacturing of products that cover, protect, contain, and enclose. We specialize in engineering and producing products that need to be flexible yet rigid, air and/or liquid tight, durable, and weather resistant. We think you will agree that we have the most experienced, talented, and creative team to help you succeed with your project. Since 1858, we have been figuring out ways to make all kinds of products — even the impossible.

CONTACT US



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