



Whitepaper

**ecoGenesis RF Plastics Welding Technology:
Business Benefits and Applications**



This Paper:

- Presents an overview of ecoGenesis, Genesis Plastics Welding’s proprietary RF technology, including capabilities and applications
- Offers third-party validation of the technology
- Offers third-party identification and support for end-use applications across many industries

Many statements in this paper are attributable to a third-party evaluation and market validity analysis conducted by OmniTech International, which was paid for jointly by Genesis Plastics Welding, Inc. and The Dow Chemical Company.

Genesis Plastic Welding’s proprietary RF welding technology, ecoGenesis™, is a unique asset to the plastics manufacturing industry. The technology is available through contracted manufacturing with Genesis or through private licensing.

In the following pages we examine the capabilities of ecoGenesis and outline its many business benefits, including:

- Lowered manufacturing costs
- Increased product performance
- Expanded product development
- The ability to meet more stringent regulatory standards
- Attention to increasing environmental concerns

What is ecoGenesis?

ecoGenesis is a one-of-a-kind Radio Frequency (RF) plastics welding technology that enables the joining of polymeric materials previously deemed by the industry as impossible to RF weld without the addition of expensive plasticizers or toxic additives. With this proprietary “bolt-on” technology, companies can transform nearly any existing RF machine to effectively weld polymers with dielectric constants far below the 0.02 level using existing RF tooling. This facilitates the ability to manufacture with a wider variety of raw materials other than polyvinylchloride (PVC) and polyurethane (PU).

According to OmniTech’s evaluation, a key differentiating factor of ecoGenesis to standard RF welding technology is that it “defies the industry’s traditional mathematical formulas and art that predict the success of a good RF weld.” Prior RF welding art allowed for only a few polymer films — like PVC and some polyurethane materials (TPU) — as candidates for a good RF weld.

OmniTech confirmed that films, copolymer films and fabrics with low dielectric factors (DLF) can efficiently and effectively be RF welded with ecoGenesis - without the aid of coatings, adhesives or other costly treatments. ecoGenesis allows standard, unmodified RF machines to produce consistently uniform, high quality welds that enhance the performance and environmental acceptability of products while potentially lowering manufacturing cost.

ecoGenesis technology can be used to engineer products not only from PVC and PU, but also from low-loss, low cost , phalate-free “green” polymers including the following:



Visit GenesisPlasticsWelding.com or call 317.485.7887 to learn more.

Polymer Group	Subgroup	Standard RF	ecoGenesis™
Polyvinylchloride	PVC	✓	✓
Polyurethane	PU	✓	✓
Polyethylene Film, Co-extrusions, Multi-laminates, Non-wovens, Foam, Fabrics	HDPE, MDPE, LDPE, LLDPE, ULDPE, mPE (metallocene)		✓
Polypropylene Film, Wovens, Non-wovens, Laminates	PP (homopolymer), CO-PP (copolymer), mPP		✓
Polyester Film, Wovens, Non-wovens	PET, CO-PET		✓
Nylon Film, Wovens, Non-wovens	NY, Co-Extruded		✓
Bioplastic	PLA, PHB, PA 11, Bio-Derived PE		✓

Background:

Genesis Plastics Welding

Genesis Plastics Welding is a contract manufacturer specializing in radiofrequency (RF) welding of thermoplastic products and components for clients worldwide.

Headquartered in Indiana, the company is the result of the merger of two long-standing organizations in the plastics industry: Genesis Manufacturing and Plastics Welding Technology.

With a combined 20-year history of growth, Genesis has a unique partnership approach to innovation, dedication to client satisfaction, and commitment to quality and excellence.

ecoGenesis is ideal for the replacement of PVC and PU with "green", phthalate-free plastics as it causes polymers with low dielectric loss factor to respond to RF welding just like PVC.

How does ecoGenesis work?

ecoGenesis is a "bolt-on" modification adaptable to existing, stabilized RF machines (27.12 Mhz). Once installed, the existing machine can weld (or seal) a thermoplastic material to another material in film, foam or fabric layers — with nothing on or between them, resulting in a clean and undisturbed final structure. ecoGenesis lasts for tens of thousands of welds, without the need for replacement. Once installed, ecoGenesis consistently produces strong, uniform welds without changes to RF tooling, RF power or frequency generation.

While Genesis utilizes its plastics welding technology in contract manufacturing services, ecoGenesis also is available for licensing to qualified plastics welding manufacturers for private use.

Benefits and Capabilities

ecoGenesis allows manufacturers to meet changing market demands, address environmental concerns, potentially lower manufacturing costs and increase product performance. This technology is especially ideal for manufacturers needing to transition away from PVC or PU for ecological, financial and/or regulatory reasons.

Primary benefits include:

Lower Manufacturing Costs	Eliminates the need for expensive heat seal additives.
	Enables the substitution of lower cost raw materials.
	Adaptable to existing, stabilized RF machines, thus expanding the use and life-cycle of most RF sealing equipment.
	Eliminates the need to invest in alternative manufacturing resources to enable welding of non-polar materials.
	Potentially creates a more cost competitive market position through the use of lower cost raw materials.
	The use of different materials may facilitate an engineering solution that decreases the manufacturing process timeline.
Increase product performance and improve appearance	Materials are welded together without performance-robbing, heat seal additives, for a clean undisturbed final structure forming the most durable, uniform, dependable and attractive welds.
Expand products and manufacturing capabilities	ecoGenesis offers the greatest versatility for existing RF equipment in the selection of polar and non-polar plastic materials — from PVC to polypropylene.
	RF weld materials as thin as 0.00025 inches.
	RF weld nearly any combination of thermoplastic materials in film, foam or fabric layers from a common polymer.
Meet regulatory standards and environmental concerns to replace PVC and the use of plasticizers	ecoGenesis enables RF welding with plasticizer-free, biologically inert materials, as it causes polymers with low DLF to respond to RF welding just like PVC.
	By manufacturing with "green", phthalate-free plastics, companies can decrease their carbon footprint and promote healthier manufacturing practices.

Services Include:

- Contract Manufacturing
- Licensing of Technology
- Consulting Services

Capabilities Include:

- RF Welding/Dielectric Welding
- Ultrasonic Welding
- Impulse Welding
- Clean Room Manufacturing
- CAD Design
- Rapid Prototyping
- Tooling Design and Creation
- Low to High Volume Production
- Consultation on Material and Process Selection
- Sheeting
- Decorating
- Die Cutting
- Assembly
- Functional Testing
- Custom Packaging
- Logistics & Shipping



ecoGenesis Market Validation Report
funded by Genesis and The Dow Chemical
Company.

Analysis conducted by OmniTech
International.

*“Dow is excited about the prospective
applications of ecoGenesis in making our
products more eco-friendly and competitive
and in expanding our product lines.”*

— Product Manager,
Dow



Capabilities: Applications for ecoGenesis

After a thorough analysis of the ecoGenesis technology, OmniTech International identified applications across many industries that could be targeted for high-cost raw material or PVC replacement, using the ecoGenesis RF welding technology.

Medical: The medical marketplace has expressed concern that toxic plasticizers used to produce the softness and suppleness of PVC films may leach out and also present disposal issues. The list of products that can be fabricated from more easily disposable non-PVC films using ecoGenesis includes IV bags, medical equipment covers, inflatable bladders, blood pressure cuffs, heating blankets, oxygen hoods, eye masks, cooling caps, hot and cold packs, cooling therapy wraps, urine collection bags, body bags, bed liners, gloves and more.

Automotive: While the automotive industry still uses RF welded PVC, Polypropylene (PP), Polyethylene (PE) or other low loss replacement materials can be welded using ecoGenesis technology. Applications include air bag sensors, car covers, manual covers, lumbar supports, seat heating and cooling pads, battery insulators, tool kits, sun visors, instrument panels, interior trim and door panels, child car seats and more.

Consumer Products: Pressure by environmentalists to replace PVC in the production of infant products is increasingly prompting consideration of other materials for applications including infant booster chairs, high chairs, crib padding, bibs, play mats, toys and mattress covers. Other products that can be fabricated using ecoGenesis include gloves, mattress pads, insulating coolers, duffel bags, reusable shopping bags, camping tents, hydration bags, imitation leather for furniture and other products, photo album sheets, shower curtains, waterbeds and waterproof clothing.

Military: Products that potentially could be manufactured with the use of ecoGenesis include protective clothing, helmet pads, duffel bags, waterproof packs, rain ponchos, stealth-like truck covers, oxygen bags, escape slides, military target balloons and life rafts.

Inflatables: Almost all inflatables are constructed from PVC or PU and are good candidates for material replacement. Samples include waterbeds, rafts, airplane escape slides, life jackets, swimming pools, furniture, balls, toys, shaped tent-like covers, signs, markers, dock levelers and shipping container insulators.

Packaging: Using ecoGenesis technology, many packaging products made of PVC due to low cost and ease of welding can now be replaced with other low cost materials, eliminating criticisms of using PVC. Applications include shielding bags, media packaging and rigid retail packaging (both clear and pigmented) for items such as toothbrush packages, shaver packages, phone and phone accessory packages and countless others.

Contact Genesis Plastics Welding for more information regarding our contract manufacturing services and the licensing of ecoGenesis.

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