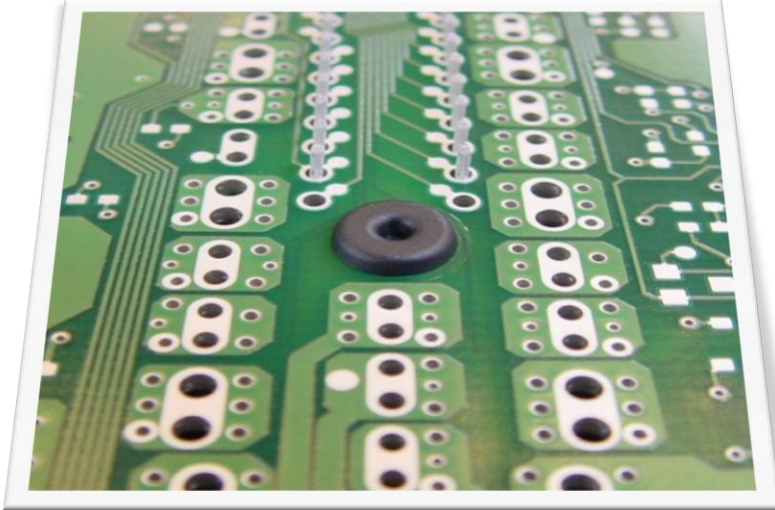


# HEAT STAKING FUNDAMENTALS

Comprehensive Manufacturer of Metalworking Machinery



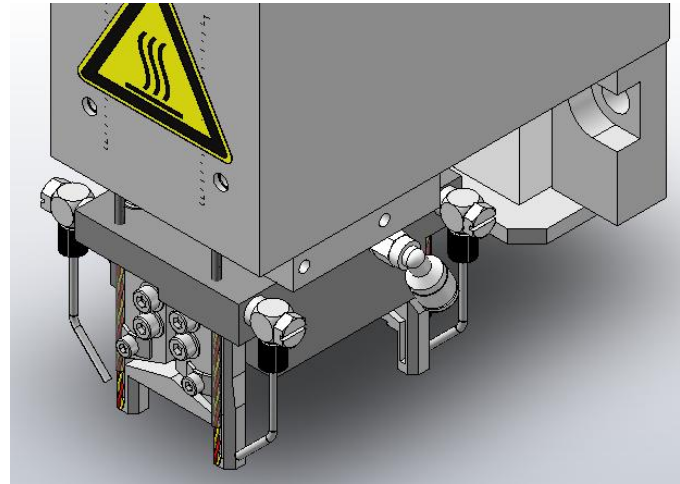
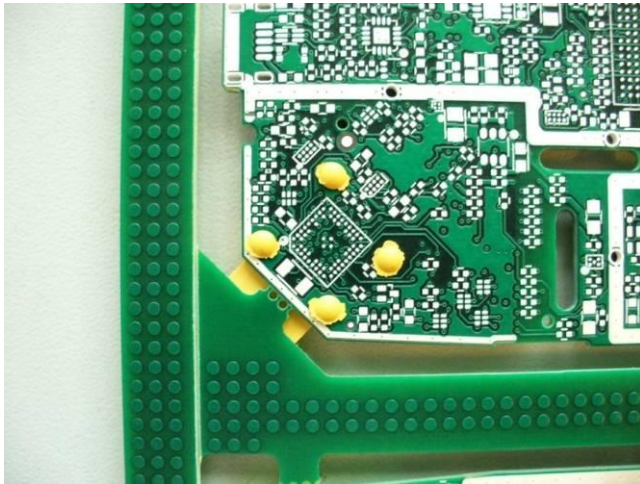
**AMADA MIYACHI EUROPE**

**MIYACHI**  
**EAPRO**

# What is Heat Staking?

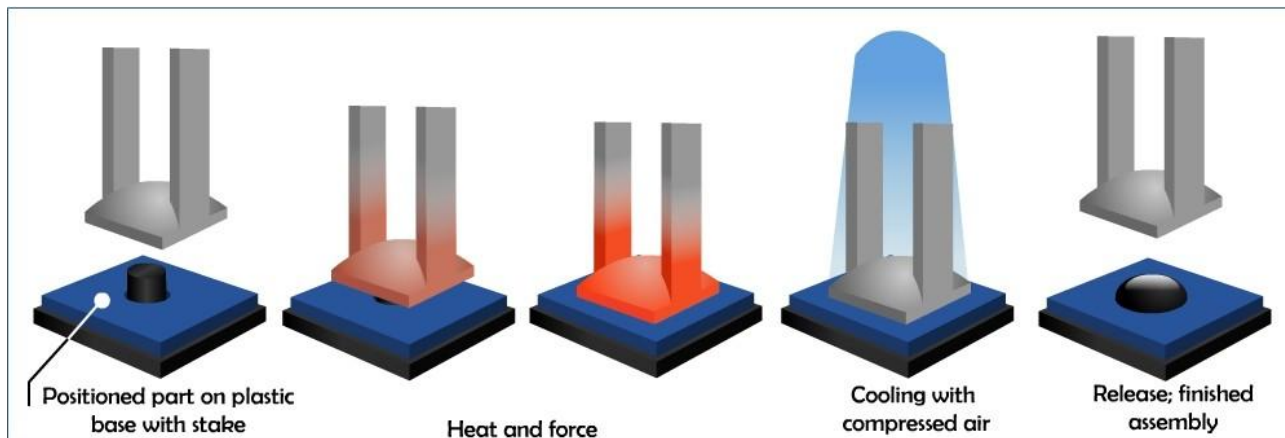
Heat Staking is a joining technology to join two or more parts together where at least one is made out of plastic. The process is used to melt and deform the plastic material using heat and force at a set process time.

De-forming the plastic is achieved by heating it above the glass transition temperature and apply pressure. After heating, the materials are cooled down under pressure again to below the glass transition temperature.



# How does it work?

- The Hot Bar or thermode, with a defined cavity, comes down on the stud
- Force is applied on the stud and once the required force is achieved the heating process starts
- The force together with the pre-set heat will soften the stud and mold it into the required shape and at the same time fix the second part
- Cool down, still under force, to below glass transition temperature and finally lift the Hot Bar/thermode

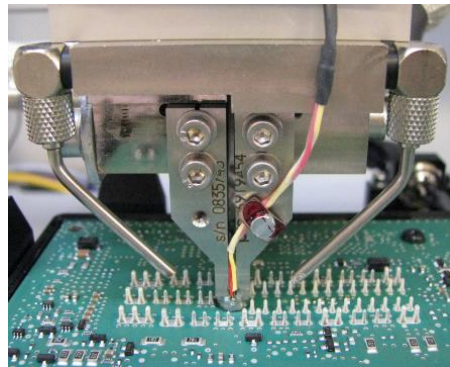


# Why choose Heat Staking as a joining process?

Using Heat Staking can be a repeatable, economical and safe method to form a stud joining two pieces of plastic or plastic and other materials.

The Heat Staking method provided by AMADA MIYACHI EUROPE is designed to precisely control heat and pressure to provide clean, odorless and safe high-quality staking of modern plastic at low cost

The big advantage of staking is that it is possible to use the base material to make such a connection. This doesn't require huge design changes and extra material, such as screws, are not needed.



# The benefits of Heat Staking using Pulsed Heat

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## Heat Staking

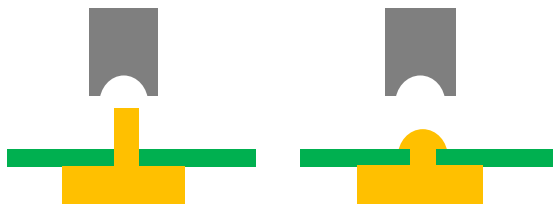
- Little stress on the stud because of heat
- Glass filled plastic can be deformed without causing embrittlement
- No damage to electronics because of local heating
- Pulsed heat can operate in a small window between glass transition and melt.
- Can handle materials with up to 40% glassfill

## Other processes

- Cold staking cannot be used for glass filled plastics
- Ultrasonic can cause embrittlement and damage to electronics

# Variations in Heat Stake designs

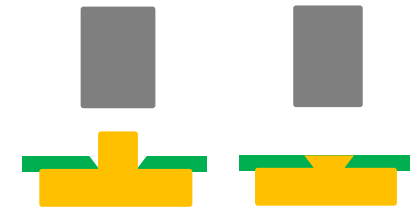
Stakes can be produced in a number of different designs. This depends on the size of the pin or what needs to be connected. Design rules and guidelines will help to determine which stake design will best fit the application.



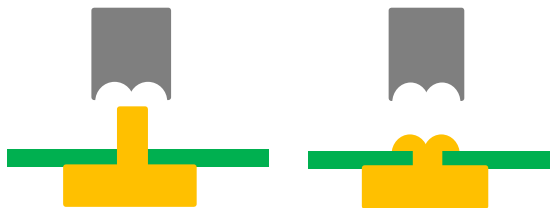
Dome shape.  
Used for small size pins.



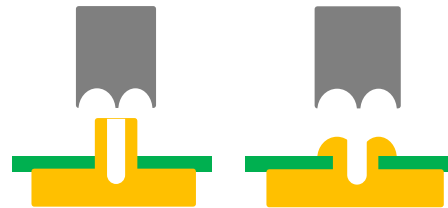
Tubular or hollow stake.  
Used for large size pins.



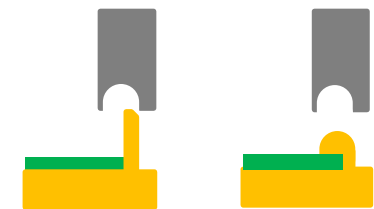
Countersunk stake



Double dome shape.  
Used for medium size pins.



Tubular or hollow stake.  
Used for large size pins.



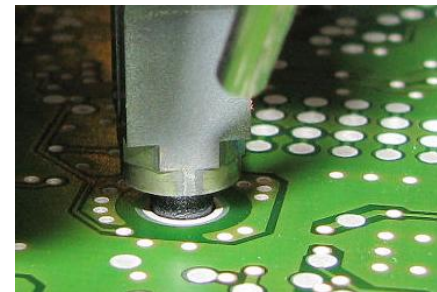
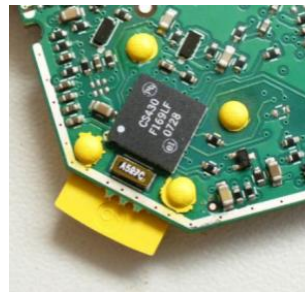
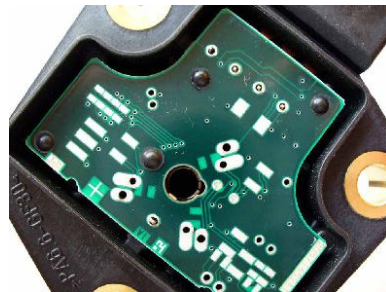
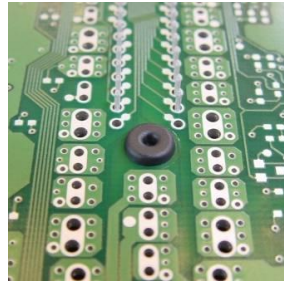
Rollover stake or captive  
stake

# Heat Staking Applications

Typical Heat Staking applications are found in a variety of industries, including Automotive, Medical, IT & Multimedia and consumer electronics.

Our Heat Staking technology is suitable for thermal Heat Staking of all thermoplastics, joining metal to plastic, heat staking of PCB's and highly filled glass fiber plastic.

Precise heat and pressure can reform studs made from the most commonly used plastics, such as polycarbonate (PC), glass-reinforced nylon (GFN), Polypropylene (PP), Polystyrene (Ps) and acrylonitrile butadiene styrene (ABS).



# Miyachi EAPRO Heat Staking Desktop Systems

The Miyachi EAPRO Desktop Systems are a line of (semi-) automatic systems developed for Heat-Staking. The Desktop Series deliver the same high bonding quality as the larger and more automated systems. For all production environments where labor costs are conservative, it offers an ideal price-performance (throughput) ratio. The system flexibility makes it also perfectly suitable for R&D environments and integration in larger systems.



## *Miyachi EAPRO Heat Staking System Features*

- Real time feedback of all process parameters, Hot Bar stroke, heat stake tip temperature through MG3 process control
- Ideal price-performance (throughput) ratio
- Simple adjustable frame construction
- Suitable for all thermoplastics
- Local heating resulting in no damage to surrounding materials
- Many heat stake shapes possible through custom designed tools
- Reliable process control, by proven technology of Uniflow Power Supply



# Miyachi EAPRO Heat Staking Standalone Systems

The Miyachi EAPRO Hot Bar Systems for Heat Staking are designed to provide a high level of process control for all heat staking applications. The systems incorporate our heat staking technology with internal air cooling and real time process monitoring for highly accurate joining of plastics to plastics and metal to plastic.

AMADA MIYACHI EUROPE has a proven track record of systems completed successfully as fully or semi-automated units. AMADA MIYACHI EUROPE combines knowledge from our in-house design department with the expertise in our in-house application and research labs when screening the feasibility of your application.



# Available technical solutions

AMADA MIYACHI EUROPE is a manufacturer of precision Heat Staking systems and Heat Staking equipment for your Heat Staking process, available from desktop Heat Staking equipment to fully automated Heat Staking systems, single or multi-point heads and turn-tables with 4 or 5 positions.

Contact our Heat Staking specialists for all your Heat Staking needs. Our engineers will be glad to go over your particular product assemblies requirements.

