

The great advantage of HF welding

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high frequency welding machine for pvc

[High Frequency Welding Machine](#) A process, also known as Radio Frequency (RF) and Dielectric welding, consists of amalgamation of material by supplying HF energy in the form of an electromagnetic field (27.12 MHz) which is normally applied between two metal electrodes, plates or moulds. HF welding is accompanied with certain pressure on the material surfaces to be joined. For this purpose the HF welding machine are constructed.

HF Welding relies on certain properties of the material being welded to cause the generation of heat in a rapidly alternating electric field, so called dielectric heating of the material to be welded. This means that only certain materials can be welded using this technique. The dynamic electric field causes the molecules in polar thermoplastics to oscillate. Depending on their geometry and dipole moment, these molecules may translate some of this oscillatory motion into thermal energy and cause heating of the material. A measure of this interaction is the loss factor, which is temperature and frequency dependent.

Advantage of high frequency welding

The great advantage of HF welding is the speed of welding: the material is heated from the inside and fuses quickly, within few seconds. In comparison with HF, in all other kinds of welding methods (with filaments, hot air or infrared radiation) the heat has to be added from the outside. It means the heat must first penetrate the material in order to make it plastic enough to form a weld. The main risk of this kind of treatment is burning the top layer of welded material.

A high frequency voltage trigger the heating within the material, no extrinsic warming applied. Generated heat causes melting of materials and their integration. After cooling the welded surface under maintained pressure, the material is fused and a weld has been created. The weld joint can be at least as strong as the surrounding material " or even stronger.

Four important factor influence the HF welding.

Eventually the material will melt, and the force supplied by the electrode will melt (fuse) the two surfaces together. After cooling a permanent seam has been created. The resulting weld seam can be as strong " or even stronger " than the surrounding material.

Typical plastic (HF) welder consists of a high frequency generator (which creates the radio frequency current), a pneumatic press, an electrode that transfers the radio frequency current to the material that is being welded and a welding bench that holds the material in place.

building process

Final products done with HF welding

Common products manufactured with HF welding method are tarpaulins, tents, ceilings, advertising outdoor banners, waterbeds, inflatable boats, drip and blood bags, tensile structures, conveyor belts, rain clothing, etc.

What materials can be HF welded

The material most common in high frequency welding is PVC (something called simply vinyl) and PU (polyurethane). The material can be thick or thin, reinforced or coated. It can also be plain, coloured or structure/patterned.

Polyvinylchloride (PVC) and polyurethanes (PU) are the most common thermoplastics that are weldable by HF also it is possible to perform HF welding on other types of materials including nylon, PA, ABS, modified TOP, PETG, but particular attention should be paid on working parameters. HF welding is not suitable for PTFE, polycarbonate, polystyrene, polyethylene or polypropylene. However, a special type of mixed fabrics have been produced recently, which have the capability to [High Frequency Welding](#) .

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