

## Empowering manufacturers with capabilities to effectively join dissimilar materials through Electromagnetic Pulse Welding

JOIN'EM project has developed working scenarios for this technology, providing a competitive edge to companies operating on the most sophisticated welding scenarios, through increased performance, efficiency and environmental benefits

**Porto Salvo, September 10<sup>th</sup>, 2018** – Innovation in manufacturing is key, as products' complexity and technical requirements keep evolving to meet new regulations and new design and efficiency challenges. The JOIN'EM project has been started in 2015 to test the effectiveness of joining dissimilar materials through Electromagnetic Pulse Welding (EPW), opening new possibilities for industries that could benefit from this technology. The project has focused on multi-material combinations: aluminium-copper, aluminium-steel and copper-steel.

As an end result, it has shown this technology's effectiveness as a flexible and cost-effective joining process for dissimilar materials for companies from diverse industrial sectors, from white goods to automotive sector. The importance of the advances made possible with this technology can be grasped by realizing that the performance requirements of innovative products strongly depends on the development of new materials or new applications of existing ones, that are ideally adapted to the requirements, the load profile, and the function of each individual component.

### Three working model are a testimony to the technology's effectiveness

This innovative technology overcomes the existing limitation of conventional joining processes, for which joining of similar and dissimilar material combinations is difficult or impossible. The joint is formed without heat, but due to the impact of the joining parts. This process needs no fluxes or shielding gases and produces no harmful smoke, fumes or slag, thus reducing the overall negative impact on environment while improving working conditions for factory staff. As part of the project's deliverables, JOIN'EM has:

- Developed 3 industrially relevant joints produced by EPW (connector bar for electrical applications, tube-to-tube & sheet-to-tube connection for heating and cooling applications);
- Developed 3 full prototypic applications (tube and sheet metal connections for heating and cooling applications, sheet metal connections for electrical applications);
- Improved part performance of at least 30% with regard to application relevant issues.

The implementation of EPW will allow designers to combine metals or to integrate new ones. This, in turn, will pave the way for several new application areas in the fields of electric devices, heating and cooling, automotive and transport, white goods, air-conditioning, and more recent fields such as high-power electronics and energy storage, enabling these industries to follow new trends in product design and manufacture components and products with leading-edge performance.

The new joining solutions will also help to implement improved lightweight designs with further weight reduction and better performance. This will decrease energy consumption and greenhouse gas emissions, an increasingly significant requirement for industries such as car manufacturing, where a weight reduction of 100 kg can result in fuel savings of about 300 to 800 litres over the vehicle lifetime, as well as reducing CO<sub>2</sub> emissions by 9 grams per kilometre.

The project partners will also look into the transferability of project results to other material combinations of relevance for industrial sectors that deal with multi-material joints. Partners include Fraunhofer - Gesellschaft für angewandte Forschung e.V. (FRAUNHOFER); Belgian Welding Institute (BWI); PFT Innovaltech (INNOVALTECH); Armines/Mines Douai (ARMINES); Research Center for Non Destructive Testing GmbH (RECENDT); Phimeca Engineering S.A. (PHIMECA); Vertech Group SARL (VERTECH); European Federation for Welding, Joining and Cutting (EWF); Whirlpool Europe SRL (WHIRLPOOL); Calyos SA (CALYOS); Cegasa Portable Energy (CEGASA) Alke SRL (ALKE), Refco nv (REFCO); Institut Catholique d'Arts et Métiers (ICAM).

### **About the European Federation for Welding, Joining and Cutting**

EWF is a pioneer in implementing a harmonised qualification and certification system for joining professionals. Through European projects, EWF has been innovating in training methodologies, and involved in the development of new technologies and uses for joining. Through its member organisations, EWF has established a firm link to the local industry, providing knowledge and training as well as participating in research initiatives that address the most pressing questions and challenges in the field of joining technologies.

#### **Contacts for media:**

Rodolfo Oliveira, BloomCast Consulting ([rodolfooliveira@bloomcast.pt](mailto:rodolfooliveira@bloomcast.pt))

Monica Sibisteanu, EWF ([msibisteanu@ewf.be](mailto:msibisteanu@ewf.be))