

HORIZON
2020

JOINing of copper to aluminium by ElectroMagnetic fields

Fact Sheet

Project Information

JOIN-EM

Grant agreement ID: 677660

[Project website](#) 

DOI

[10.3030/677660](https://doi.org/10.3030/677660) 

Project closed

EC signature date

20 July 2015

Start date

1 September 2015

End date

31 August 2018

Funded under

INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Advanced manufacturing and processing

Total cost

€ 4 715 912,50

EU contribution

€ 4 127 029,00

Coordinated by

FRAUNHOFER GESELLSCHAFT
ZUR FORDERUNG DER
ANGEWANDTEN FORSCHUNG
EV



Germany

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Objective

Global trends force industry to manufacture lighter, safer, more environmentally-friendly, more performant, and cheaper products. Due to its excellent thermal and electrical conductivity, copper is widely used in heating and cooling equipment and electrical devices. The rising demand caused the copper price to increase significantly.

Solving the conflict between the technological benefits arising from the excellent properties of copper and the disadvantages regarding cost and weight is possible by substituting current full copper parts by copper-aluminium hybrid parts. Within JOIN'EM, such components will be produced by electromagnetic pulse welding (EMW).

EMW is a high-speed joining technology using pulsed magnetic fields. The joint is formed without heat, but due to the impact of the joining partners. Disadvantages associated with conventional technologies are avoided and high-quality dissimilar material combinations can be joint.

In JOIN'EM, strategies for the process and tool design shall be developed for joining copper-aluminium connections and for 2 other specific material combinations. Profile-shaped components as well as sheet metal applications will be regarded.

For joint optimisation, surface preparation, design of the joint geometry, and other aspects will be investigated. A multi scale simulation strategy will be developed for determination of acting loads, deformation, impacting conditions, joint formation, and load capacity of the joint.

Designing durable and efficient tools is an indispensable prerequisite for the industrial implementation of the technology and will be addressed in the project.

The applicability of the process design strategy shall be validated based on industrial applications. Process and equipment design strategies will be evaluated in an industrial setting. This includes automation and quality control, economic efficiency calculations, life-cycle, and recycling issues, to demonstrate and quantify the advantages of EMW.

Fields of science (EuroSciVoc)

[natural sciences](#) > [physical sciences](#) > [electromagnetism and electronics](#) > **[electromagnetism](#)**

[social sciences](#) > [sociology](#) > [industrial relations](#) > **[automation](#)**

[natural sciences](#) > [chemical sciences](#) > [inorganic chemistry](#) > **[post-transition metals](#)**

[natural sciences](#) > [mathematics](#) > [pure mathematics](#) > **[geometry](#)**



Keywords

[Joining by electromagnetic forming](#)

[aluminium](#)

[copper](#)

[joining technologies](#)

[mechanical engineering](#)

[heating and cooling applications](#)

[electrical applications](#)

[magnetic pulse welding](#)

Programme(s)

[H2020-EU.2.1.5. - INDUSTRIAL LEADERSHIP - Leadership in enabling and industrial technologies - Advanced manufacturing and processing.](#) MAIN PROGRAMME

[H2020-EU.2.1.5.1. - Technologies for Factories of the Future](#)

Topic(s)

[FoF-12-2015 - Industrial technologies for advanced joining and assembly processes for multi-materials](#)

Call for proposal

[H2020-FoF-2014-2015](#)

[See other projects for this call](#)

Sub call

H2020-FoF-2015

Funding Scheme

[IA - Innovation action](#)

Coordinator



FRAUNHOFER GESELLSCHAFT ZUR FORDERUNG DER ANGEWANDTEN FORSCHUNG EV

Net EU contribution

€ 693 212,50

Total cost

€ 693 212,50

Address

HANSASTRASSE 27C

80686 Munchen

 **Germany** 

Region

Bayern > Oberbayern > München, Kreisfreie Stadt

Activity type

Research Organisations

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Participants (14)



BELGISCH INSTITUUT VOOR LASTECHNIEK VZW

 **Belgium**

Net EU contribution

€ 538 288,75

Address

ANTOON VAN OSSLAAN 1

1120 Bruxelles / Brussel 

Region

Activity type

Research Organisations

Links

- [Contact the organisation](#)
- [Website](#)
- [Participation in EU R&I programmes](#)
- [HORIZON collaboration network](#)

Total cost

€ 538 288,75



LYCEE GENERAL ET TECHNOLOGIQUE CONDORCET

France

Net EU contribution

€ 428 653,75

Address

17 RUE HENRI HERTZ
02100 Saint-Quentin

Region

Hauts-de-France > Picardie > Aisne

Activity type

Higher or Secondary Education Establishments

Links

- [Contact the organisation](#)
- [Participation in EU R&I programmes](#)
- [HORIZON collaboration network](#)

Total cost

€ 428 653,75



ASSOCIATION POUR LA RECHERCHE ET LE DEVELOPPEMENT DES METHODES ET PROCESSUS INDUSTRIELS

France

Net EU contribution

€ 165 750,00

Address

BOULEVARD SAINT MICHEL 60
75272 Paris 

Region

Ile-de-France > Ile-de-France > Paris

Activity type

Research Organisations

Links

[Contact the organisation](#)  [Website](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost

€ 238 375,00

 **THIRD-PARTY** 

INSTITUT MINES-TELECOM

 France

Net EU contribution

€ 72 625,00

Address

19 PLACE MARGUERITE PEREY
91120 Palaiseau 

Region

Ile-de-France > Ile-de-France > Essonne

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 
[Participation in EU R&I programmes](#) 
[HORIZON collaboration network](#) 

Total cost

No data



RESEARCH CENTER FOR NON DESTRUCTIVE TESTING GMBH

 Austria

Net EU contribution

€ 398 750,00

Address

ALTENBERGER STRASSE 69 SCIENCE PARK 2/2 OG
4040 Linz 

Region

Westösterreich > Oberösterreich > Linz-Wels

Activity type

Research Organisations

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

€ 398 750,00



PHI-MECA ENGINEERING

 France

Net EU contribution

€ 144 812,50

Address

CENTRE D'AFFAIRE DU ZENIT L'ARCHE, RUE DE SARLIEVE 34
63800 Cournon-D'Auvergne 

SME 

Yes

Region

Auvergne-Rhône-Alpes > Auvergne > Puy-de-Dôme

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

€ 206 875,00



VERTECH GROUP

 France

Net EU contribution

€ 250 687,50

Address

11 RUE DEFLY

06000 Nice 

SME 

Yes

Region

Provence-Alpes-Côte d'Azur > Provence-Alpes-Côte d'Azur > Alpes-Maritimes

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

€ 358 125,00



EUROPEAN FEDERATION FOR WELDING JOINING AND CUTTING

 Belgium

Net EU contribution

€ 250 381,25

Address

AV ANTOON VAN OSS 1 4

1120 Bruxelles / Brussel 

SME 

Yes

Region

Région de Bruxelles-Capitale/Brussels Hoofdstedelijk Gewest > Région de Bruxelles-Capitale/ Brussels Hoofdstedelijk Gewest > Arr. de Bruxelles-Capitale/Arr. Brussel-Hoofdstad

Activity type

Other

Links

- [Contact the organisation](#)
- [Website](#)
- [Participation in EU R&I programmes](#)
- [HORIZON collaboration network](#)

Total cost

€ 250 381,25



BEKO ITALY MANUFACTURING SRL

Italy

Net EU contribution

€ 287 875,00

Address

VIA VARESINA 204
20156 MILANO

Region

Nord-Ovest > Lombardia > Milano

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

- [Contact the organisation](#)
- [Website](#)
- [Participation in EU R&I programmes](#)
- [HORIZON collaboration network](#)

Total cost

€ 411 250,00



CALYOS

Belgium

Net EU contribution

€ 123 812,50

Address

RUE DE L'INDUSTRIE 24
1400 Nivelles

SME

Yes

Region

Région wallonne > Prov. Brabant Wallon > Arr. Nivelles

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

- Contact the organisation
- Participation in EU R&I programmes
- HORIZON collaboration network

Total cost

€ 176 875,00



CEGASA PORTABLE ENERGY SLU

Spain

Net EU contribution

€ 182 784,00

Address

AVENIDA LOS HUETOS 75
01010 Vitoria Gasteiz



SME



Yes

Region

Noreste > País Vasco > Araba/Álava

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

- Contact the organisation
- Participation in EU R&I programmes
- HORIZON collaboration network

Total cost

€ 261 120,00



ALKE SRL



Italy

Net EU contribution

€ 161 043,75

Address

VIA CILE 3-5-7

35127 Padova



SME 

Yes

Region

Nord-Est > Veneto > Padova

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

€ 230 062,50



REFCO NV

 Belgium

Net EU contribution

€ 223 046,25

Address

AMBACHTSSTRAAT 16

2390 Malle



SME 

Yes

Region

Vlaams Gewest > Prov. Antwerpen > Arr. Antwerpen

Activity type

Private for-profit entities (excluding Higher or Secondary Education Establishments)

Links

[Contact the organisation](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

€ 318 637,50



INSTITUT CATHOLIQUE D'ARTS ET METIERS

 France

Net EU contribution

€ 205 306,25

Address

RUE AUBER 6

59000 Lille 

Region

Hauts-de-France > Nord-Pas de Calais > Nord

Activity type

Higher or Secondary Education Establishments

Links

[Contact the organisation](#)  [Website](#) 

[Participation in EU R&I programmes](#) 

[HORIZON collaboration network](#) 

Total cost

€ 205 306,25

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Permalink: <https://cordis.europa.eu/project/id/677660>

European Union, 2025