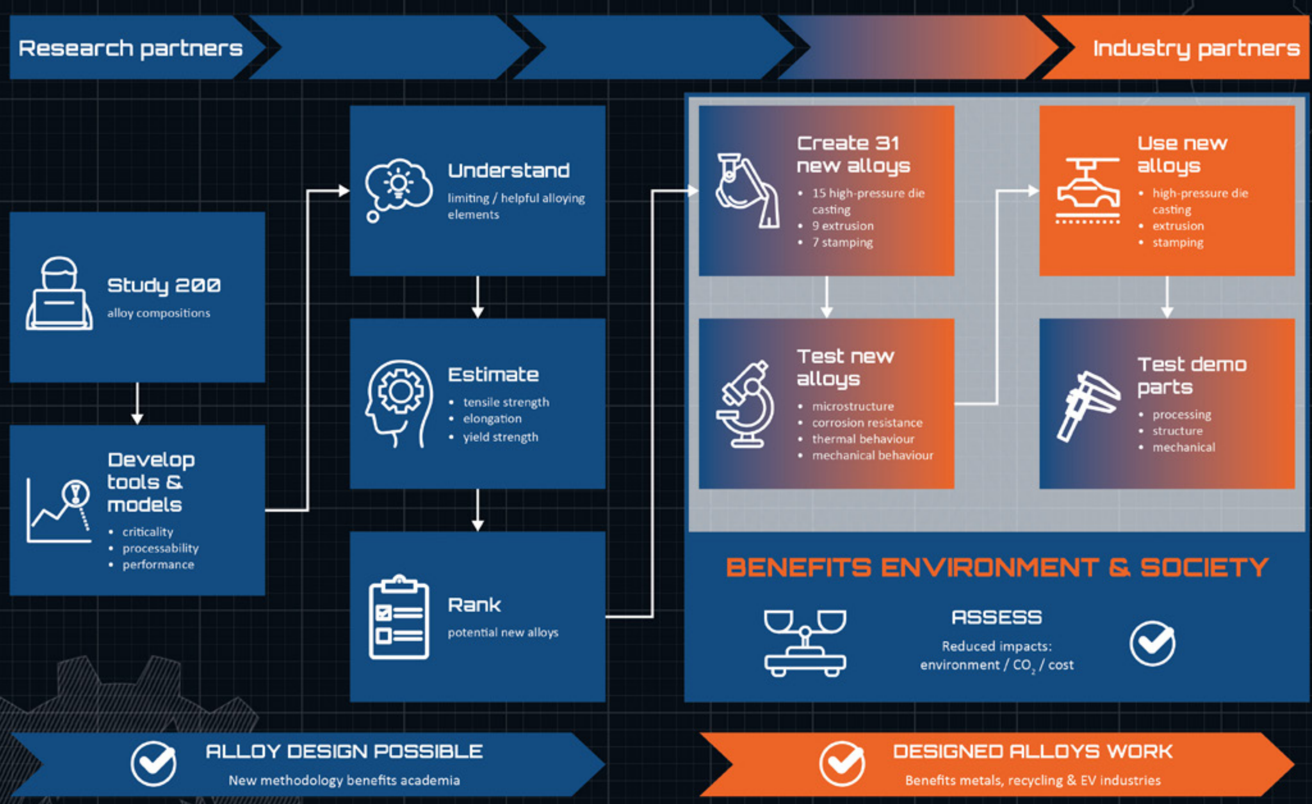

SALEMA designs new, sustainable, high-performance aluminium alloys

The EU-funded SALEMA project developed a new methodology to 'design' alloys with more recycled aluminium or less critical raw materials (CRM) and still meet the high-performance needs of typical automotive industry manufacturing processes. SALEMA's research and industrial partners worked together to design, create and test the alloys, bringing together perspectives and expertise from across the aluminium value chain.

- **SALEMA's design methodology has been proven to create industrially suitable, sustainable aluminium alloys.**
- **SALEMA's design methodology provides a new approach, tools and knowledge for future research and learning.**
- **SALEMA's alloy design methodology can be applied for other metals and industries.**
- **SALEMA's alloy design methodology supports Europe's goals to reduce use of imported CRM and primary materials, and increase sustainability of industry and future mobility.**

To read more about SALEMA's alloys, their design, results, benefits and the relevant contact partners, turn the page or visit the SALEMA website.

The SALEMA project received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N°101003785. The content of this publication reflects only the authors view; the contents and any use that may be made of this information is not the responsibility of HaDEA or the European Union.

ALLOY DESIGN METHODOLOGY

STEPS Studied 200 aluminium alloys used in stamping / extrusion / high-pressure die casting (HPDC). Developed criticality & processability index to characterise alloys' performance & characteristics.

Used thermodynamic code & computer simulation to explain processability, understand which alloying elements limit / enhance. Estimated mechanical performance when replacing Si or Mg / optimising heat treatment or work hardening parameters.

Predicted new alloy compositions, associated them to the criticality index, ranked them.

OUTPUT 31 new low- critical raw material (CRM) / high-recycled content alloy 'recipes' (best (theoretical) processability/performance/criticality compromise) for HPDC (15), extrusion (9), stamping (7).

TESTED Samples of new alloys were produced at lab scale and their microstructure, mechanical properties & corrosion resistance were determined.

SHOWED Can design alloys for specific uses: can use thermodynamic code to understand theoretical behaviour; can develop models explaining processability based on composition. Can achieve almost 100% scrap content in SALEMA extrusion alloys 6063 and 6082.

BENEFITS Research & academia (metallurgy & engineering): new knowledge tools & methodology.

CONTACT
University of Padua: www.unipd.it
Prof. Franco Bonollo: franco.bonollo@unipd.it

Eurecat: www.eurecat.org
Manel da Silva: manel.dasilva@eurecat.org

Łukasiewicz IMN: www.imn.gliwice.pl
Sonia Boczkal: **sonia.boczkal@imn.lukasiewicz.gov.pl**

ALLOY CREATION & TESTING

STEPS Created the new SALEMA alloys using standard industrial processes.

Selected 10 of the tested alloys as suitable for:

- **HPDC** – SALEMA AlSi10MnMg (EN AC 43500) Variant 6 (90% scrap) & Variant 4 (70% scrap); SALEMA AlSi8MnMg Variant 7; SALEMA AlMg2 Variant 12
- **Extrusion** – SALEMA EN AW 6063 Variant 3 (up to 90% scrap) & EN AW 6082 Variant 3 (up to 90% scrap); SALEMA 6111 Variant 2 (85% scrap)
- **Hot stamping** – SALEMA 6111 Variant 2 & SALEMA EN AW 6181A Variants 2&3 (70% & 85% scrap)
- **Cold stamping** – SALEMA EN AW 6181A Variants 2&3, & SALEMA EN AW 5754 Variants 1&2 (70% & 85% scrap)

Created & tested car parts using SALEMA alloys. *('SALEMA alloys meet industry needs' factsheet)*

ASSESSED Environmental / cost impacts of (less CRM / more recycled) alloys' composition & production, and of car parts.

SHOWED Designed alloys can achieve target properties. Electric vehicle (EV) components can use low CRM / high recycled designed alloys. Life cycle assessment (LCA) can quantify reduced environmental impact (less CRM & emissions).

BENEFITS Aluminium, recycling & EV industries. Environment & society

CONTACT
Raffmetal (casting alloys): www.raffmetal.com
Ruggero Zambelli: ruggero.zambelli@raffmetal.it

Profilglass (stamping alloys): www.profilglass.it
Giovanni Sbrega: giovanni.sbrega@profilglass.it

ASAŞ (extrusion alloys): www.asastr.com
Tutku Özen: tutku.ozen@asastr.com

Eurecat (LCA): www.eurecat.org
Violeta Vargas Parra: violeta.vargas@eurecat.org