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NEXT-GENERATION LIGHTWEIGHT UNWELDED PRESS-FIT SHOCK ABSORBER BODY

Sustainable Shock Absorber Design


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ORGANISATION PROFILE

Ulus Metal Industry and Trade Inc.

1991

%100 Turkish Capital

Tunalılar Family

Gebze Kocaeli / TR

Zabrze Katowice / PL

40 M € %45 Export

IATF 16949
ISO 9001
ISO 14001
ISO 45001
TISAX

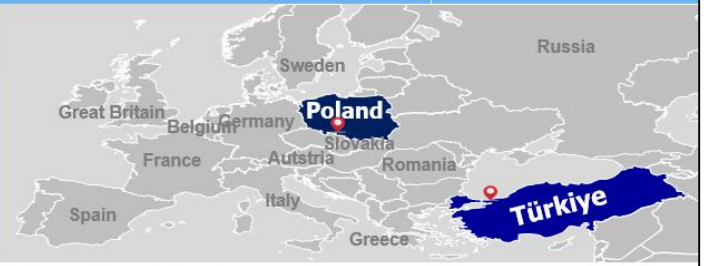
PLANTS

2 Plants
20K m^2 / 23K m^2

1 Plants
27K m^2 / 7K m^2

2 Plants
345 Employees

1 Plants
64 Employees



Capabilities

Tool/Fixture Desing & Engineering

Sheet Metal Forming & Machining

Presses	CNC Equip.
- Transfer (TR10/PL4)	- Turning (9/-)
- Progressive (8/2)	- M.Center (1/-)
- Hydraulic (4/-)	
- Manual Tandem (40/9)	
- Robotic Press Line (1/-)	

Welding, Assembly & Special Pro.

Welding	Assembly
- Projection (17/7)	- S/A Outer Body
- MAG (4/1)	- Bracket Assy.
	- Silicon Application

24Kton material usage, 67M stamping comp. manufacturing, 39M parts sales

Our Products

ULUS METAL

https://en.ulusmetal.com.tr/

ORGANISATION PROFILE

ERKBA

WHAT IS ERKBA

ERKBA is an engineering firm located in the Bilişim Vadisi Technology Development Zone, specializing in the development of software, hardware, machine, AR & VR.

2020

Gebze Kocaeli / TR

10 M$

TÜBİTAK

BİLİŞİM VADİSİ

CAPABILITIES

EYLÜL
Physiotherapy and Wellness Center

MEKIPYAZ
Cloud-based industry data tracking platform.

Our facility is equipped with both CNC Routers, 3D printers and mold machines.

VR and multiple device entegration.

OUR SOLUTIONS

https://erkba.com/

PROPOSAL INTRODUCTION (I)

Vision: To develop a next-generation lightweight, weld-free shock absorber body by replacing traditional welding with a patented press-fit joining technology, enabling reduced weight, higher structural integrity, and improved sustainability in suspension systems.

Motivation: Conventional welding in shock absorber manufacturing increases production cost, energy consumption, and potential defects such as porosity and deformation.Additionally, the use of low-carbon steel limits weight reduction. Therefore, it is necessary to develop a press-fit based, weld-free structure compatible with lightweight materials (e.g., aluminum or composites) to meet the requirements of next-generation vehicles and sustainability goals.

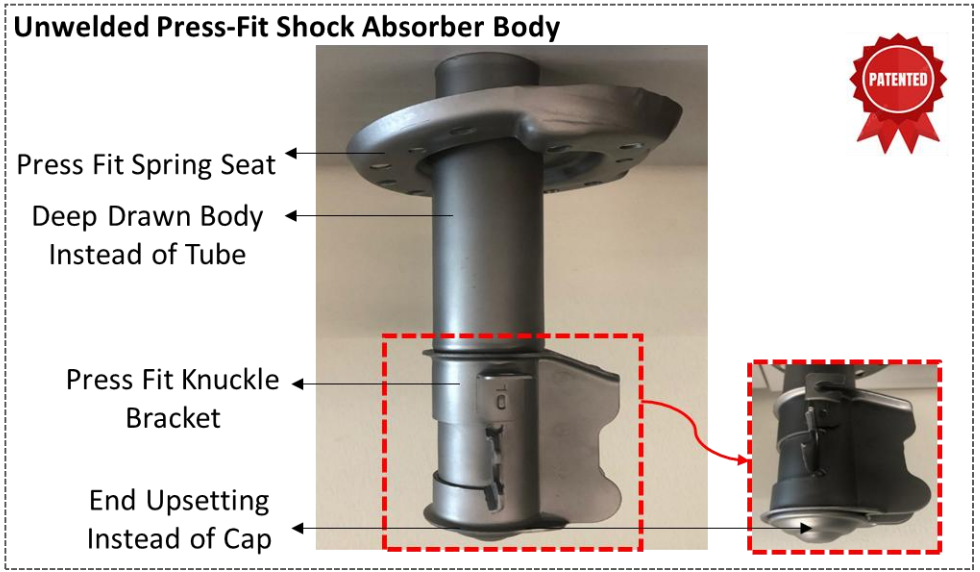
Content:
This project focuses on a full-body shock absorber system that is currently produced using low-carbon steel and assembled through welding. Shock absorber subcomponents include a tube body, stabilizer bar bracket, spring seat, base cap and knuckle bracket. Other components are welded conventionally on the tube body.

The product has been redesigned to replace the traditional welding method with a patented press-fit joining technique developed by our company (TURKPATENT Application No: 2012/11076). Within the scope of the project, the patented product will be redesigned using lightweight materials such as aluminum and composites instead of low-carbon steel.

PROPOSAL INTRODUCTION (I)

Content:

Previous Situation



Improved Situation

PROPOSAL INTRODUCTION (II)

Expected outcome:

- Integration of lightweight and high-strength materials (such as aluminum alloys and composites) into the shock absorber body design.
- Reduced production time, lower energy consumption, and decreased carbon footprint compared to conventional welded manufacturing methods.
- Significant reduction in total vehicle weight per unit, contributing to improved fuel efficiency and lower emissions.
- Development of a sustainable and commercially viable product suitable for next-generation lightweight vehicles in the European automotive market.

Impacts:

- By replacing welding with press-fit joining, the project minimizes CO_2 emissions and energy use, contributing directly to green manufacturing goals.
- Establishment of an innovative manufacturing method that can be applied to other chassis and suspension components.
- Strengthening Ulus Metal's competitive advantage as a Tier-1 supplier offering patented lightweight solutions to OEMs.
- Generating know-how in lightweight design, material substitution, and joining technologies to be transferred to future R&D projects.
- Increasing occupational safety by removing hazardous welding operations and promoting cleaner production environments.

Schedule:

- Start Date: June 2026
- End Date: May 2028
- Duration: 24 months

PARTNERS

Current:

ULUS METAL:
- Provide the patented press-fit full body shock absorber design
- Lead the redesign of the housing using lightweight materials
- Supply real production data and factory conditions
- Coordinate industrialization and customer validation efforts

ERKBA:
- Carry out simulation (FEA) studies to verify structural performance
- Contribute to product optimization and manufacturability
- Assist in documentation and technical reporting

Partner search:

Material Expert Company (Aluminum / Composite Manufacturers)
- To supply and advise on lightweight materials suitable for structural automotive components.

Mechanical Testing Company
- To perform structural, fatigue, and durability tests on the redesigned full body shock absorber system components.

Academic Institution (Material and Mechanical Analysis Support)
- To provide scientific validation, simulations, and advanced material characterization.

OEM or Tier-1 Customer (for Pilot Application)
- To evaluate and integrate the developed lightweight part into real vehicle platforms and provide feedback for industrialization.

CONTACT INFO

Ömer Emre UÇAKKUŞ
R&D Manager
Ulus Metal Industry and Trade Inc.
omer.ucakkus@ulusmetal.com.tr
+90 (552) 836 41 71

Mehmet Batuhan ERKEK
General Manager
ERKBA
batuhanerkek@erkba.com
+90 (538) 390 19 02

Reyhan CEYLAN
R&D Engineer
Ulus Metal Industry and Trade Inc.
reyhan.ceylan@ulusmetal.com.tr
+90 (538) 280 67 26

Türkay MURATOĞLU
R&D Engineer
Ulus Metal Industry and Trade Inc.
turkay.muratoglu@ulusmetal.com.tr
+90 (555) 494 97 57

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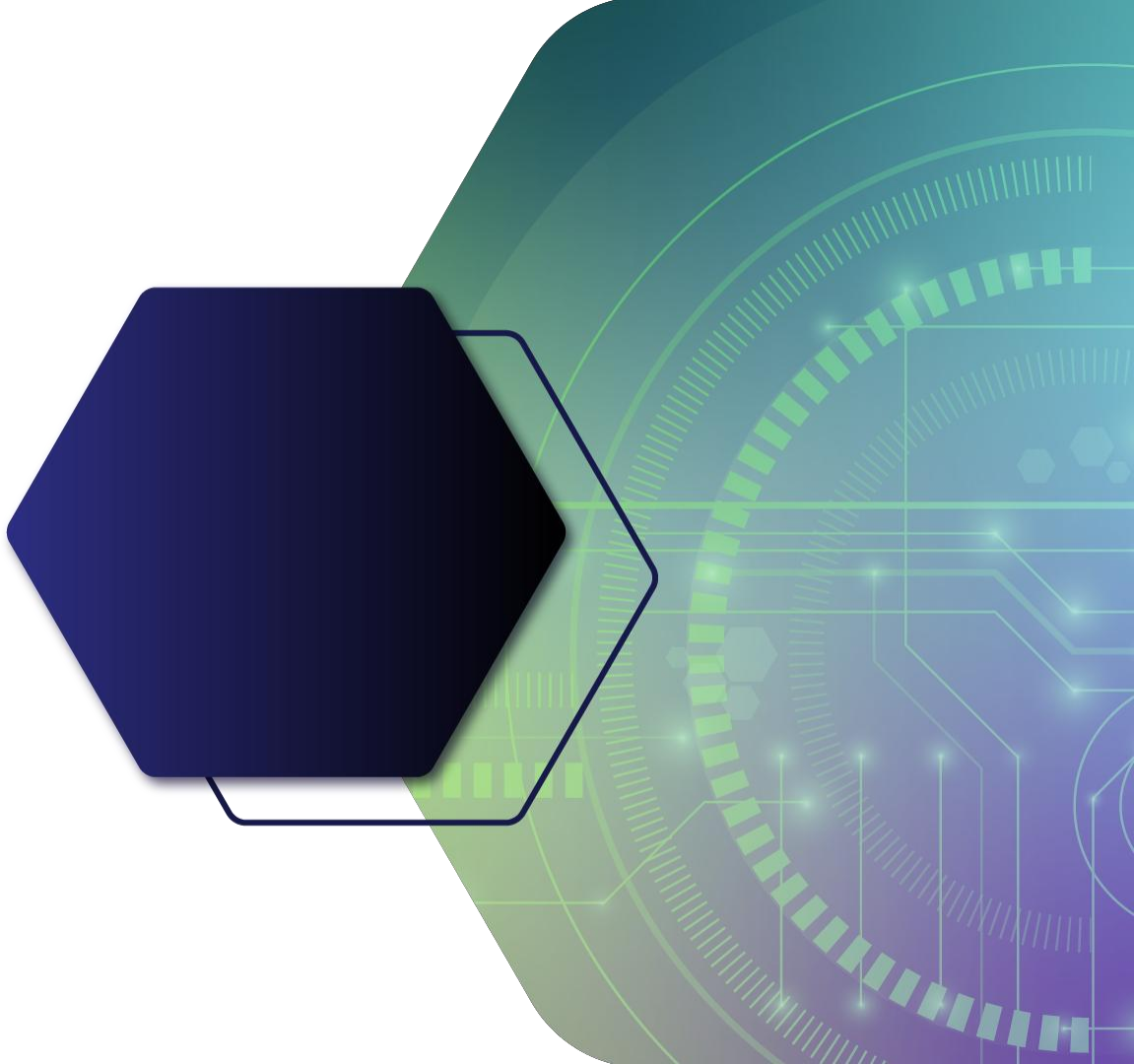

www.smarteureka.com