



FormPlanet CWAs

Building a common framework for OITBs to make the most of standardisation

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FORMPLANET - OVERVIEW AND OBJECTIVE



Sheet Metal Forming Testing Hub
Facts and figures



AIM: boost the sheet metal forming industry by developing and validating an **integrated ecosystem** offering **novel sheet metal characterisation and modelling methodologies** to characterise sheet material properties, predict part performance and prevent production losses



3 years duration, from January 2019 to December 2021



17 participants from **8 different countries**



Funded by the Horizon 2020 programme
Grant agreement ID: 814517





FORMPLANET - OVERVIEW AND OBJECTIVE



Consortium

FormPlanet consortium is composed of **17 partners** from **8 European countries**: 5 leading technological sites, 4 service providers and 8 industrial companies.





FORMPLANET - OVERVIEW AND OBJECTIVE



The new experimental and modelling methodologies can help the sheet metal sector:

Assure **zero-defects production** (reduction of rejected parts).

1

Develop new **high-performance sheet materials at reduced costs** by the optimisation of the design, production and performance of the sheet material.

2

Reduce **time-to-market** and develop **new high-performance sheet parts** at reduced cost by the optimisation of the design and manufacture processes.

3

Increase **productivity** in the manufacture of sheet metal parts.

4

Improve **quality parts** using non-destructive techniques to in-line assess part integrity in high quality products.

5

Build **robust processes** to prevent unexpected failures due to deviations from batch to batch of the sheet metal coil or plates, using tests to control raw material properties.

6





FORMPLANET - OVERVIEW AND OBJECTIVE



Advanced testing methodologies for more accurate **sheet metals characterisation**, **non-destructive in-process measurements** and **modelling**, addressing processability and quality parts problems in the sheet manufacturing sector



Sheet material development and production



Part and forming process design



Components production





FORMPLANET – Novel characterisation services



Sheet material development and production



Edge cracking and stretch-flangeability

- Optimised Hole Expansion Test (HET)
- Half Specimen Dome Test (HSDT)
- Local damage evaluation of shear edges



Delayed fracture and H embrittlement

- H diffusion testing
- Slow Strain Rate Test (SSRT)
- Four Point Bending Test (FPBT)
- Small Punch Test (SPT) of thin sheets



Fatigue resistance

- Fatigue resistance test



Fracture toughness

- Fracture toughness evaluation of thin and thick sheets
- Quasi-static as well as dynamic conditions



Micro-mechanical characterisation

- Micro-tensile tests
- X-Ray microtomography



Crashworthiness

- Dynamic component testing
- Stereo high-speed imaging
- 3D deformation field measurement





Part forming and process design



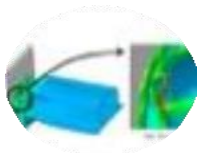
Forming limits evaluation at room and high temperature

- High temperature FLC characterisation
- Biaxial tensile test at room temperature
- Deep drawing test



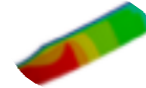
Edge cracking

- Edge tracking modelling and prediction



Modelling of part performance

- Modelling of crash boxes



H embrittlement

- Modelling of H embrittlement



Material data for modelling

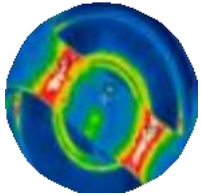
- Smart material data characterisation – Calibration of proper material relations
- Stepwise Modelling Method (SMM)
 - Hardening behaviour from initial yielding beyond necking to final fracture
 - Testing at various stress states
 - Isotropic and anisotropic materials



FORMPLANET – Novel characterisation services



Components production



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In-process check systems

- Wear prediction in tooling
- Laser tracking
- Advanced thermography for part integrity



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In-line part quality assessment

- 3MA system for quality inspection of components
- Industrial on-line diffusible H measurement





FORMPLANET - OVERVIEW AND OBJECTIVE



- ✓ FormPlanet ecosystem is conceived as an Open Innovation Test Bed (OITB), a single entry point for accessing the characterisation and modelling services.
- ✓ Most of the services consist of non-standardised methodologies. Standardization activities are crucial for ***the acceptance and utilisation by the market of the developed solutions***
- ✓ Project coordination aware of the importance of standardisation: to disseminate the project results and to facilitate the implementation of the developed solutions
- ✓ Collaboration of all partners in standardisation-related activities from the beginning of the project
- ✓ Project results and deliverables easily transferred into CWAs, quick development in few months





“To facilitate the acceptance and utilisation by the market of the developed solutions”



Initial **analysis** of the standardization landscape



Contribution to the ongoing and future standardization developments



Standardization **guidance** for Test Bed users

Standardisation **proposals**

Standards **(CWAs)**



FORMPLANET – BENEFITS OF CWAs FOR THE PROJECT



Disseminate the project **findings**



Increase project **impact**



Support the **implementation** of the test bed services



Facilitate the acceptance and utilisation by the **market**



FORMPLANET – CWAs PROCESS





CEN/WS FormPlanet “Innovative testing in support of the sheet metal forming industry”

Chair: EURECAT

Secretariat: UNE





FORMPLANET – PUBLISHED CWAs



CEN

CWA 17793

WORKSHOP

August 2021

AGREEMENT

ICS 77.040.10

English version

Test method for determination of the essential work of fracture of thin ductile metallic sheets

This CEN Workshop Agreement has been drafted and approved by a Workshop of representatives of interested parties, the constitution of which is indicated in the foreword of this Workshop Agreement.

The formal process followed by the Workshop in the development of this Workshop Agreement has been endorsed by the National Members of CEN but neither the National Members of CEN nor the CEN-CENELEC Management Centre can be held accountable for the technical content of this CEN Workshop Agreement or possible conflicts with standards or legislation.

This CEN Workshop Agreement can in no way be held as being an official standard developed by CEN and its Members.

This CEN Workshop Agreement is publicly available as a reference document from the CEN Members National Standard Bodies.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Measurement of diffusible hydrogen in metallic materials - HELIOS 4 HOT PROBE method

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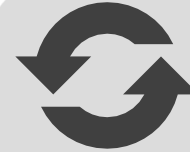


FORMPLANET – LESSONS LEARNED



INVOLVEMENT

Remark consortium
the benefits of
developing CWAs



CONVERT

Take advantage of already
finished deliverables to
develop CWAs



PRINCIPLES

Follow Transparency,
Openness, Consensus
standardisation principles



RULES

Follow CEN/CENELEC
Guide 29 for process &
CEN IR Part 3 for drafting



INFORM

Continuously
inform relevant
TCs





Thank you for your attention!



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A project coordinated by:

eurecat