

CEN Workshop FLEXCRASH “Integration of additive manufacturing into conventional production for aluminium body-in-white components”

Workshop description form

- PART A – Workshop Summary
- PART B – Project Plan

PART A – Workshop SUMMARY

1	WS details		
1.1.	Organization	☒ CEN ☐ CENELEC ☐ Joint with ☐ CEN lead ☐ CENELEC lead	
1.2.	Title	FLEXCRASH Integration of additive manufacturing into conventional production for aluminium body-in-white components (select CEN or CLC or leave CEN/CLC in case of joint WS)	
1.3.	Scope	Provide guidelines for the integration of additive manufacturing into conventional production routes for aluminium body-in-white components. It will cover manufacturing and structural performance validation, as well as environmental and economic assessment of hybrid manufacturing solutions.	
1.4.	Does this WS stem from an EU Research project?	☒ YES Name of the project: Flexible and hybrid manufacturing of green aluminium to produce tailored adaptive crash-tolerant structures Grant number: 101069674 ☐ End date 2026/12/31 ☐ NO	
1.5.	Financial support	☒ EU Research project ☐ EC/EFTA Grant reference: Type here ☐ Other Specify, if needed: Type here	
1.6.	WS Proposer/Proposed Chair WS proposer	Name: Organization: Postal address: Email: Phone: Webpage: Contact person (name and email):	Hannah Arpke Eurecat Av. Universitat Autònoma, 2308290 Cerdanyola del Vallès hannah.arpke@eurecat.org Type here www.eurecat.org Type here
1.7.	WS Secretariat	Organization: Postal address: Email: Phone: Webpage: WS Secretary name: Email: Phone:	UNE (Spanish Association for Standardisation) Génova street 6, 28004 Madrid (Spain) info@une.org (+34) 915 249 900 www.une.org Javier López Rodríguez jlopezr@une.org (+ 34) 648 77 77 17
1.8.	CEN and CENELEC Management Centre (CCMC) contact	Organization: Postal address: Webpage: CCMC Project Manager name: Email: Phone:	CEN and CENELEC Rue de la Science 23B - 1040 Brussels, Belgium https://www.cencenelec.eu/Pages/default.aspx Claire Van Thielen cwa@cencenelec.eu +3225500831 +32478793545

1.9.	Tentative date and place of the Kick-off Meeting	Date: 22/09/2026	Place: Online
1.10.	Does the proposed Workshop fall within the scope of existing CEN and/or CENELEC Technical Bodies?¹	☐ YES Specify: Type here ☒ NO	
1.11.	Are there other Technical Bodies or Joint Advisory and Coordination Groups potentially interested in the Workshop?²	☒ YES Specify: CEN/TC 132 - Aluminium and aluminium alloys CEN/TC 438 - Additive Manufacturing CEN/TC 301 - Road vehicles CEN/TC 473 - Circular Economy CEN/SS S26 - Environmental management ISO/TC 261 "Additive manufacturing" ☐ NO	
1.12.	Are the following aspects affected?	Safety matters YES ³ ☐ NO ☒ Management system aspects YES ⁴ ☐ 7 ☒ Conformity assessment aspects YES ⁵ ☐ NO ☒ Security matters YES ⁶ ☐ NO ☒ NO ☐ 8 ☒	
		Add information/explanations if Management System aspects and Conformity Assessment aspects are affected: Type here	
2	WS Deliverables		
2.1.	CWA #1		
2.1.1	Title	☐ Same as WS title (1.2) ☒ Other: Integration of additive manufacturing into conventional production for aluminium body-in-white components — Guidelines for manufacturing and structural performance validation	
2.1.2	Scope	This document establishes guidelines for the integration of DED-LB/P additive manufacturing into the conventional production of aluminium body-in-white components. It covers the development, manufacturing, quality assurance, and structural performance validation of hybrid aluminium structures incorporating additively manufactured features or reinforcements. The document includes recommendations for design, production, inspection, and laboratory-scale testing under static, dynamic, and crash-relevant loading conditions to support industrial implementation in automotive applications.	
2.1.3	Does the proposed CWA conflict with a published EN	☐ YES Specify: Type here ☒ NO In case the answer is 'yes', the development of the CWA shall be stopped	

¹ Part A and Part B of this form shall be sent by the WS secretary to the secretary of the Technical Bodies identified in this section to inform them about the creation of the WS and register any possible objection within 30 days (45 during the holiday period).

² Part A and Part B of this form should be sent by the WS secretary to the Bodies identified in this section to inform them about the creation of the WS.

³ Work on the proposed CEN and/or CENELEC Workshop shall not be initiated.

⁴ The CEN and/or CENELEC Workshop proposal shall be submitted to the CEN/CENELEC BT(s) for decision.

⁵ CEN-CENELEC Internal Regulations - Part 3, Clause 33 applies.

⁶ For projects dealing with security matters the security risk analysis provided in Annex I shall be carried out.

⁷ See Note 2 in CEN-CENELEC Guide 29, Clause 3.

⁸ See Note 2 in CEN-CENELEC Guide 29, Clause 3.

2.2.	CWA #2		
2.1.1	Title	☐ ☒	Same as WS title (1.2) Other: Integration of additive manufacturing into conventional production for aluminium body-in-white components — Guidelines for environmental and economic assessment
2.1.2	Scope		This document specifies the methodological principles and requirements for performing an integrated environmental and economic assessment of hybrid manufacturing routes that combine conventional manufacturing processes with additive manufacturing technologies. The methodology applies to the implementation of additive manufacturing within existing production lines for metallic body-in-white (BIW) components of road vehicles. This document is applicable to metallic BIW components manufactured through hybrid manufacturing configurations integrating additive and conventional production processes. This document provides sector-specific and application-oriented methodological guidance for the assessment of hybrid manufacturing in the automotive body-in-white context.
2.1.3	Does the proposed CWA conflict with a published EN	☐ ☒	YES Specify: Type here NO In case the answer is 'yes', the development of the CWA shall be stopped

PART B – Project Plan

Abstract

The automotive industry is increasingly exploring the integration of additive manufacturing (AM) into conventional production processes to improve the performance, sustainability, and resource efficiency of aluminium body-in-white (BIW) structures. In particular, hybrid manufacturing approaches that combine conventional aluminium forming technologies with Directed Energy Deposition using Laser Beam Powder (DED-LB/P) enable the local reinforcement of components and the development of tailored structural solutions with enhanced crashworthiness and lightweighting potential.

Despite the growing maturity of these technologies, their industrial adoption is hindered by the lack of harmonized guidance covering both technical validation and sustainability assessment. Manufacturers, technology providers, and research organisations require a common framework to evaluate the manufacturing feasibility, structural performance, environmental impacts, and economic viability of hybrid aluminium components. To address this need, this Workshop will develop two complementary CEN Workshop Agreements (CWAs):

- Integration of additive manufacturing into conventional production for aluminium body-in-white components — Guidelines for manufacturing and structural performance validation
- Integration of additive manufacturing into conventional production for aluminium body-in-white components — Guidelines for environmental and economic assessment

Together, these CWAs will provide practical guidance for the development, assessment, and implementation of hybrid manufacturing routes for aluminium BIW components. They will support a common understanding of manufacturing requirements, validation methodologies, and sustainability assessment approaches, thereby facilitating industrial uptake, improving comparability of results, and contributing to future standardization activities in the field of hybrid manufacturing. The CWAs will not establish regulatory requirements, certification schemes, product qualification procedures, or mandatory acceptance criteria. Instead, they will provide voluntary guidance and best-practice recommendations to support research, innovation, and industrial deployment.

1 Status of the project plan

Draft project plan for public commenting (Version 1.0)

This draft project plan is intended to inform the public of a new Workshop. Any interested party can take part in this Workshop and/or comment on this draft project plan by sending an email to the WS secretary.

All those who have applied for participation or have commented on the project plan by the deadline will be invited to the kick-off meeting of the Workshop on **2026-09-22**.

2 Workshop proposer and potential Workshop participants

2.1 Workshop proposer

The proposer of this CEN Workshop is the EU-funded research project FLEXCRASH under Grant agreement n. 101069674. More information: <https://flexcrash-project.eu/>

The project consortium comprises 11 partners from 6 different European countries: Spain, Sweden, Italy, Austria, Germany and Slovenia.

Proposed Chair: Hannah Arpke (EURECAT)

EURECAT is the coordinator of FLEXCRASH and combines extensive experience in managing collaborative European research and innovation projects with technical expertise in advanced materials, hybrid manufacturing, structural testing and industrial validation. Its experience with CEN Workshop Agreements includes the Horizon 2020 SALEMA project, coordinated by EURECAT, which resulted in **CWA 18112:2024, Aluminium and its alloys – Fluidity evaluation via multi strip testing moulds**. This agreement establishes a robust and repeatable strip-testing method for evaluating the fluidity and high-pressure die-casting suitability of aluminium alloys for thin-wall components. EURECAT provided the Workshop Chair, while Hannah Arpke participated directly in the development and approval of the CWA, giving her first-hand experience of the CEN Workshop process.

This experience is complemented in FLEXCRASH by the application of CWA 18107-2:2024 for accelerated fatigue assessment and by active cooperation with UNE and relevant technical committees to identify project results suitable for standardisation. As FLEXCRASH project coordinator and proposed Workshop Chair, Hannah Arpke has a strong interest in translating the project's validated technical and sustainability results into clear, consensus-based guidance that supports industrial uptake and creates impact beyond the project lifetime.

Proposed Secretariat: Javier López. Project Manager at UNE (Spanish Association for Standardization)

2.2 Potential participants

This CWA will be developed in a Workshop (temporary body) that is open to any interested party. The participation of the following persons/organizations would be helpful and is desired. It is recommended that:

- Academic and research bodies with expertise in LCA/LCC, additive manufacturing, aluminium materials, lightweight structures, crashworthiness, and hybrid manufacturing;
- Funded European Projects: Horizon project ALABAMA (Grant Agreement No. 101138842), Horizon project GEAR-UP (Grant Agreement No. 101178484), RFCS project Steel4Fatigue (Grant Agreement No. 101157245);
- Industrial stakeholders across the automotive, additive manufacturing and aluminium value chains, including OEMs, suppliers, equipment manufacturers, material producers, recyclers, software providers and consumables suppliers;
- Public authorities and policy organisations dealing with automotive environmental regulation, emissions, industrial sustainability, circular economy and critical raw materials;
- NGOs and sectoral organisations active in circular economy, resource efficiency, LCA and sustainable transport/manufacturing;

take part in the development of this CWA.

3 Workshop objectives and scope

3.1 Workshop background

The proposed Workshop originates from the Horizon Europe FLEXCRASH project (Grant Agreement No. 101069674), funded by the European Union under the Horizon Europe Programme. FLEXCRASH develops innovative hybrid manufacturing solutions that combine conventional aluminium production technologies with additive manufacturing (AM) to enable the production of lightweight, crashworthy, and resource-efficient Body-in-White (BIW) structures for road vehicles. The project addresses the complete value chain, including design, material selection, manufacturing, joining, structural validation, crashworthiness assessment, and sustainability evaluation. The increasing need to reduce vehicle weight, improve energy efficiency, lower greenhouse gas emissions, and support electrification is driving the adoption of advanced manufacturing technologies within the automotive industry. Additive manufacturing offers significant opportunities for component optimisation, functional integration, material savings, and enhanced structural performance. However, large-scale industrial deployment requires the integration of AM technologies into established automotive manufacturing routes, including forming, machining, joining, welding, assembly, and quality assurance processes. Despite significant technological advances, the industry currently lacks harmonised approaches for evaluating and validating such hybrid manufacturing solutions.

A number of international and European standards are already available for additive manufacturing technologies, metallic materials, vehicle testing, environmental assessment, and life-cycle analysis. However, these standards typically address individual technologies, processes, or assessment methodologies separately. Currently, there is no specific guidance addressing the integration of additive manufacturing into conventional automotive production systems, nor harmonised methodologies for assessing the technical performance, manufacturing efficiency, environmental impact, and economic viability of hybrid manufacturing routes for aluminium automotive structures. As a result, manufacturers, technology providers, and research organisations face difficulties in comparing results, demonstrating reproducibility, assessing scalability, and supporting industrial decision-making for large-scale implementation.

The purpose of the proposed Workshop is to address this gap by developing common principles, terminology, methodologies, and guidance for the validation and assessment of hybrid manufacturing solutions combining additive manufacturing and conventional production processes.

Two CEN Workshop Agreements are envisaged as outcomes of the Workshop. The first CWA will provide the development process and advanced lab-scale testing procedures to evaluate the crashworthiness of hybrid aluminium structures reinforced with AVFFs using DED-LB/P additive manufacturing. Particular attention will be given to the interaction between manufacturing process chains and component performance, including the influence of manufacturing technologies, joining methods, quality assurance procedures, manufacturing robustness, scalability, crashworthiness, and sustainability performance. This CWA will support manufacturers, technology providers, engineering organisations, and research institutions in evaluating the benefits and limitations of hybrid manufacturing approaches while improving consistency, transparency, and comparability of assessment results.

The second CWA will provide methodological principles and requirements for performing an integrated environmental and economic assessment of hybrid manufacturing routes that combine conventional manufacturing processes with additive manufacturing technologies. This second CWA responds to the current lack of harmonised methodologies for evaluating the environmental and economic performance of such hybrid manufacturing routes, adapting the general principles of existing life-cycle assessment standards to the specific characteristics of combined additive and conventional aluminium production processes. Its future benefit lies in enabling manufacturers, technology providers, and research organisations to compare the environmental and economic performance of different hybrid manufacturing configurations on a consistent basis, to identify where

in the process chain the greatest environmental or economic gains can be achieved, and to support the environmental re-design (ecodesign) of vehicle components from early development stages. This CWA is not intended to define new life-cycle impact assessment methods, characterisation factors, or environmental indicators beyond those already established in existing international standards, nor to set mandatory environmental or economic performance thresholds for hybrid manufacturing routes. It does not cover the certification or verification of environmental or economic claims, nor the crashworthiness or structural performance aspects addressed by the first CWA.

The CWAs are expected to provide a common framework for assessing hybrid manufacturing solutions from technical, environmental, and economic perspectives, thereby facilitating industrial uptake, promoting best practices, and supporting future standardization activities in Europe. The proposed CWAs are not intended to standardize additive manufacturing processes, equipment, materials, or production parameters, nor to establish vehicle homologation requirements, regulatory crash-test procedures, or certification schemes. The proposed Workshop is also relevant within the broader European policy framework supporting sustainable and circular manufacturing, including the European Green Deal, the Circular Economy Action Plan, the Ecodesign for Sustainable Products Regulation (ESPR), and the ongoing revision of the End-of-Life Vehicles Regulation. The methodologies developed within the Workshop may contribute to the assessment of more sustainable manufacturing routes and support future environmental and circularity-related reporting requirements across the automotive sector.

The Workshop is directly linked to the FLEXCRASH project and builds upon results generated in several work packages focused on advanced manufacturing technologies, hybrid process chains, crashworthiness validation methodologies, testing protocols, and life-cycle-based environmental and economic assessments. The project includes a dedicated standardization work package that identifies CEN Workshop Agreements as an appropriate mechanism for transferring project outcomes into the European standardization system and preparing the basis for potential future standards.

Given its multidisciplinary nature, the proposed Workshop is expected to be relevant to several standardization bodies and technical committees, including those active in the fields of additive manufacturing, road vehicles, metallic materials, testing and validation methods, and environmental management. As a result, the outcomes of the Workshop may be relevant to technical bodies active in these fields and facilitate the future transfer of Workshop outcomes into the European and international standardization framework.

4 Workshop programme

4.1 General

The kick-off meeting is planned to take place on 22/09/2026 from 10:00 to 12:00 as virtual meeting.

A total of 2 Workshop meetings (kick-off meeting and Workshop meetings) and web conferences will be held, during which the content of the CWA(s) will be presented, discussed and approved.

The working language (language of meetings, minutes, etc.) of the WS will be English. The CWA will be written in English.

4.2 Workshop schedule

Table 1: Workshop schedule (preliminary)

CEN/CENELEC Workshop	Jul 2026	Aug 2026	Sept 2026	Oct 2026	Nov 2026	Dec 2026	Jan 2027	Feb 2027
Initiation								
1. Workshop description form submission and TC response								
2. Open commenting period on draft project plan (mandatory)								
Operation								
3. Kick-off meeting								
4. CWA(s) development								
6. CWA(s) finalized and approved by Workshop participants								
Publication								
7. CWA(s) publication								
<u>Dissemination (see 6)</u>								
Milestones			K			V/A		P D

Legend



- K** Kick-off
- M** Workshop meeting
- V** Virtual Workshop meeting
- A** Adoption of CWA
- P** Publication of CWA
- D** Online distribution of CWA

5 Resource planning

There is no fee for registration of participation in the Workshop, as it will be financed within the framework of the research project FLEXCRASH. However, all costs related to the participation of interested parties in the Workshop's activities (e.g. travels) have to be borne by themselves.

6 Workshop structure and rules of cooperation

6.1 Participation in the Workshop

The Workshop will be constituted during the kick-off meeting. By approving this project plan, the interested parties declare their willingness to participate in the Workshop and will be formally named as Workshop participants, with the associated rights and duties. Participants at the kick-off meeting who do not approve the project plan are not given the status of a Workshop participant and are thus excluded from further decisions made during the kick-off meeting and from any other decisions regarding the Workshop.

As a rule, the request to participate in the Workshop is closed once it is constituted. The current Workshop participants shall decide whether any additional members will be accepted or not.

Any new participant in the Workshop at a later date is decided on by the participants making up the Workshop at that time. It is particularly important to consider these aspects:

- a. expansion would be conducive to shortening the duration of the Workshop or to avoiding or averting an impending delay in the planned duration of the Workshop;
- b. the expansion would not result in the Workshop taking longer to complete;
- c. the new Workshop participant would not address any new or complementary issues beyond the scope defined and approved in the project plan;
- d. the new Workshop participant would bring complementary expertise into the Workshop in order to incorporate the latest scientific findings and state-of-the-art knowledge;
- e. the new Workshop participant would actively participate in the drafting of the manuscript by submitting concrete, not abstract, proposals and contributions;
- f. the new Workshop participant would ensure wider application of the CWA.

All Workshop participants who approved the publication of the CWA or its draft will be named as authors in the European Foreword, including the organizations which they represent. All Workshop participants who did not approve the publication of the CWA will not be named in the European Foreword.

6.2 Workshop responsibilities

The Workshop Chair is responsible for content management and consensus building. The Workshop Chair is supported by the Workshop Vice-Chair (if any) and the responsible Workshop secretariat, whereby the Workshop secretariat will always remain neutral regarding the content of the CWA(s). Furthermore, the Workshop secretariat shall ensure that CEN-CENELEC's rules of procedure, rules of presentation, and the principles governing the publication of CWA(s) have been observed. Should a Workshop Chair no longer be able to carry out her/his duties, the Workshop secretariat shall initiate the election of a new Workshop Chair. The list below covers the main tasks of the Workshop Chair. It is not intended to be exhaustive.

- Content related contact point for the Workshop
- Presides at Workshop meetings

- Ensures that the development of the CWA respects the principles and content of the adopted project plan
- Manages the consensus building process, assesses when the Workshop participants have reached agreement on the final CWA, on the basis of the comments received
- Ensures due information exchange with the Workshop secretariat
- Represents the Workshop and its results to exterior

The Workshop secretariat, provided by a CEN and/or CENELEC Member, is responsible for organizing and leading the kick-off meeting, in consultation with the Workshop proposer. Further Workshop meetings and/or web conferences shall be organized by the Workshop secretariat in consultation with the Workshop Chair. The list below covers the main tasks of the Workshop secretariat. It is not intended to be exhaustive.

- Administrative and organizational contact point for the Workshop
- Ensures that the development of the CWA respects the principles and content of the adopted project plan and of the requirements of the CEN-CENELEC Guide 29
- Formally registers Workshop participants and maintains record of participating organizations and individuals
- Offers infrastructure and manages documents and their distribution through an electronic platform
- Prepares agenda and distributes information on meetings and meeting minutes as well as follow-up actions of the Workshop
- Initiates and manages CWA approval process upon decision by the Workshop Chair
- Interfaces with CEN-CENELEC Management Centre (CCMC) and Workshop Chair regarding strategic directions, problems arising, and external relationships
- Advises on CEN-CENELEC rules and brings any major problems encountered (if any) in the development of the CWA to the attention of CEN-CENELEC Management Centre (CCMC)
- Administrates the connection with relevant CEN or CENELEC/TCs

6.3 Decision making process

The CEN and/or CENELEC Workshop Chair is responsible for ensuring that the development of the CWA follows the principles and content of the project plan described in this document and the requirements of CEN-CENELEC Guide 29. The CEN and/or CENELEC Workshop Chair may take decisions on the conduct of the CEN and/or CENELEC Workshop on the basis of the comments expressed by the participants and of CEN-CENELEC Guide 29.

Decisions shall be taken based on consensus of the WS participants.

7 Dissemination and participation strategy

The dissemination and participation strategy of the FLEXCRASH proposer will be implemented as a structured and targeted plan covering the full life cycle of the Workshop: preparation, open commenting, Workshop execution, publication of the CWAs, and post-publication uptake. The strategy will build on FLEXCRASH communication, dissemination and exploitation activities, while making use of the communication channels of the consortium partners, the Workshop Secretariat, CEN-CENELEC and relevant stakeholder networks. Its main objective is to ensure that the CWAs are not only published, but also actively promoted, understood and used by the communities that can benefit from them.

The target audience will include stakeholders across the full hybrid manufacturing value chain for aluminium body-in-white components: automotive OEMs, suppliers, aluminium producers and recyclers, additive

manufacturing equipment and material providers, engineering and simulation companies, testing laboratories, LCA and LCC practitioners, research and technology organisations, universities, industrial associations, circular economy and sustainability organisations, public authorities and relevant standardization bodies. The stakeholders listed in section 2.2 and in Part A will be used as the initial dissemination map.

Before and during the Workshop, FLEXCRASH will actively promote participation through the project website, news items, newsletter, LinkedIn and other professional social media channels, partner websites, direct email campaigns, project events and partner networks. The communication will explain the purpose of the Workshop, the expected CWA deliverables, the opportunities to contribute during the open commenting phase and the benefits of participation for industrial and research stakeholders. Direct invitations will be sent to selected organisations with relevant expertise in aluminium processing, additive manufacturing, road vehicle structures, crashworthiness validation, LCA/LCC and circular manufacturing, in order to ensure balanced and technically relevant participation.

At publication stage, the CWAs will be announced as key exploitable outputs of FLEXCRASH and will be made available through the official CEN-CENELEC distribution channels. FLEXCRASH will publish dedicated news items and explanatory material on the project website, including direct links to the CWAs, a short description of their scope, the intended users, and the added value for validating hybrid aluminium BIW manufacturing routes and assessing their environmental and economic performance. The consortium will also prepare concise dissemination material, such as short articles, social media posts, presentation slides and newsletter content, so that partners can communicate the CWAs consistently through their own institutional and industrial networks.

The post-publication dissemination plan will combine broad communication with targeted outreach. Broad communication will include the FLEXCRASH website, project newsletter, LinkedIn posts, partner communication channels, conference presentations, technical workshops, project events, scientific and technical publications, and final project dissemination activities. Targeted outreach will include direct communication to relevant CEN and ISO technical bodies, national standardization committees, sectoral associations, European projects working on related topics, and selected industrial stakeholders with potential to apply the guidance. This targeted approach is intended to help the CWAs reach users who can implement the recommendations in future research, industrial validation activities, sustainability assessments and standardization discussions.

To support uptake after publication, FLEXCRASH partners will refer to the CWAs in relevant project deliverables, exploitation activities, training or capacity-building actions, stakeholder meetings and discussions with related European initiatives. The consortium will encourage partners and associated stakeholders to use the CWAs as a reference framework when presenting project results, comparing hybrid manufacturing routes, defining future validation activities or identifying standardization gaps. Feedback received after publication may also be used to identify whether further standardization activities, such as a follow-up CWA, European Standard or contribution to existing CEN/ISO technical work, could be appropriate.