

<sup>1</sup>2016-11-16

## **Project Plan for a CEN Workshop Agreement on Mechanical Test Data (CEN/WS METEDA)**

### **1. Status of the Project Plan**

Approved at the kickoff meeting on 2016-11-09.

### **2. Background to the Workshop**

#### Market environment

From materials supply to the design and manufacture of advanced products, the engineering materials supply chain has become reliant on electronic systems. To date however, the engineering materials sector has largely failed to adopt technologies for collecting, exchanging, and reporting creep, creep crack growth, creep-fatigue, and creep-fatigue crack growth test data. Given this circumstance, the further development of technologies for engineering materials test data has the potential to improve the development and utilization of advanced materials for engineering applications.

#### Motivation for the creation of this Workshop

The Workshop is a component of the I-NERI project on a digital infrastructure for advanced structural materials data (DIASM). As such, the Workshop is intended (1) to deliver data formats for compliant with international standards for creep, creep crack growth, creep-fatigue, and creep-fatigue crack growth testing and (2) to provide the nuclear energy sector (and other industrial sectors that produce and/or rely on engineering materials data) an effective means for collecting, exchanging, and reporting test data. To this extent it will build on prior and ongoing Workshops that have delivered data formats for tensile test data, fatigue test data, and material pedigree data.

#### Legal environment

The Workshop responds directly to the need for interoperability of engineering materials data and the standardization of data formats as mentioned in Article 3.2.20 (Nuclear Safety and Security) of the Annual Union Work Programme for European Standardisation 2015<sup>2</sup>.

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<sup>1</sup> Date updated by the last editor

### Existing standards and standard related activities

The Workshop aims to deliver a computer-readable data formats compliant with ISO and ASTM International standards for creep, creep crack growth, creep-fatigue, and creep-fatigue crack growth testing. Candidate standards include [ISO 204](#) “Metallic materials -- Uniaxial creep testing in tension -- Method of test”, [ASTM E1457](#) –“Standard Test Method for Measurement of Creep Crack Growth Times in Metals”, [ASTM E2714](#) –13 “Standard Test Method for Creep-Fatigue Testing” and ASTM [E2760-10](#)“Creep/Fatigue Crack Growth Testing”, respectively. With regard to the development of the data formats, prior relevant Workshops include CEN/WS ELSSI EMD and CEN/WS SERES and existing relevant Standards include ISO 10303 “Industrial automation systems and integration -Product data representation and exchange”.

### **3. Workshop proposers and Workshop participants**

The Workshop proposers are the partners in the I-NERI DIASM project consortium, namely the European Commission, ORNL, ASM International, and EPRI. Workshop registered participants will include stakeholders from the engineering materials sector and related industrial sectors and relevant standardization organizations.

### **4. Workshop scope and objectives**

The International Nuclear Energy Research Initiative (I-NERI) between the European Union and the US Department of Energy recognizes that activities in the scope of nuclear safety and security must be international in scope. The proposed Workshop supports nuclear safety and security by providing the platform for the development of technical specifications for structural materials data that will find application in the I-NERI DIASM project. Specifically, the Workshop aims to deliver computer-readable data formats compliant with international standards for creep, creep crack growth, creep-fatigue, and creep-fatigue crack growth testing.

Common formats for test data will ease the data collection and comparison process. In turn, more readily available test data on structural materials for nuclear power plants will contribute to the validation of materials models. In this context, the DIASM project builds on an earlier I-NERI project that integrated the Gen IV Materials Handbook at ORNL and the EC materials database, MatDB. The new Workshop will deliver technical specifications that extend this embryonic IT infrastructure to enable the exchange and aggregation of a broader range structural materials test data. The Workshop will deliver revised technical specification for material pedigree data (based on CWA 16762:2014<sup>3</sup>) and new technical specifications for mechanical properties test data (based on the methodology described in

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<sup>2</sup> The annual Union work programme for European standardisation for 2015. COM(2014) 500 final. Retrieved 7 April 7, 2016 from at <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52014DC0500>.

<sup>3</sup> CWA 16762:2014. ICT Standards in Support of an eReporting Framework for the Engineering Materials Sector (2014). Retrieved April 7, 2016 <http://www.cen.eu/work/areas/ICT/eBusiness/Pages/WS-SERES.aspx>.

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CWA 16200:2010<sup>4</sup>) compliant with the relevant international standards for uniaxial creep, creep crack growth, creep-fatigue, and creep-fatigue crack growth, engaging the nuclear energy community in an effort to promote their adoption. The materials pedigree and uniaxial creep standard formats will be verified independently against existing database collections. The efficacy of technical specifications for uniaxial creep and creep crack growth data delivered by the Workshop will be demonstrated in the DIASM project using the infrastructure developed in the scope of the earlier I-NERI project.

In the context of European energy research, the European Commission materials database (MatDB) hosted at <https://odin.jrc.ec.europa.eu> serves the data management needs of many materials research projects. INCEFA-PLUS is one such project on the topic of increasing safety in NPPs by covering gaps in environmental fatigue assessment<sup>5</sup>. The project includes an ambitious testing program and in this context data formats for environmentally assisted fatigue will be developed with a view to streamlining the data collection and analysis procedures. Similarly, MatDB is providing support to the MatISSE project on materials' innovations for a safe and sustainable nuclear in Europe<sup>6</sup> and the technical specifications for uniaxial creep, creep crack growth, creep fatigue and creep fatigue crack growth, will help to improve data collection, sharing, and analysis. In this context, creep-fatigue data are used for the European RCC-MRx design code, while creep-fatigue crack growth data find application in assessment procedures and in design code appendices.

The Gen IV Materials Handbook host by ORNL plays an important role in the ongoing activities of the GenIV International Forum (GIF), providing data for codification of candidate materials under the ASME Boiler and Pressure Vessel Codes<sup>7</sup>. This codification is dependent on materials test data to benchmark materials models needed to develop reactor design rules. For example, in Code Section III - Rules for Construction of Nuclear Facility Components, its Subsection NH for Class 1 Components in Elevated Temperature Service requires data to establish models for creep-fatigue in NH-T-1400 Creep-Fatigue Evaluation; and Part D – Properties of Code Section II - Materials requires data to establish maximum allowable stress limits in the creep and stress-rupture governed temperature range. Extending the existing IT infrastructure to use standards compliant data formats will streamline the data collection process and thereby accelerate the development of the codes.

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<sup>4</sup> CWA 16200:2010. A Guide to the Development and Use of Standards compliant Data Formats for Engineering Materials Test Data (2010). Retrieved April 7, 2016 from [ftp://ftp.cen.eu/CEN/Sectors/List/ICT/CWAs/CWA16200\\_2010\\_ELSSI.pdf](ftp://ftp.cen.eu/CEN/Sectors/List/ICT/CWAs/CWA16200_2010_ELSSI.pdf).

<sup>5</sup> European Commission : CORDIS : Projects & Results Service : INcreasing Safety in NPPs by Covering gaps in Environmental Fatigue Assessment. Retrieved April 7, 2016 from [http://cordis.europa.eu/project/rcn/197289\\_en.html](http://cordis.europa.eu/project/rcn/197289_en.html).

<sup>6</sup> European Commission : CORDIS : Projects & Results Service : Materials' Innovations for a Safe and Sustainable nuclear in Europe. Retrieved April 7, 2016 from [http://cordis.europa.eu/project/rcn/110016\\_en.html](http://cordis.europa.eu/project/rcn/110016_en.html).

<sup>7</sup> ASME Boiler and Pressure Vessel Code, ASME International (2013).

## 5. Workshop programme

### Work plan

The Workshop duration is 28 months. The technical tasks of the Workshop are planned to be completed over a 21-month period and will result in the delivery of data formats compliant with international standards for creep, creep crack growth, creep-fatigue, and creep-fatigue crack growth testing. The Workshop will deliver a single CEN Workshop Agreement (CWA) on the topic of standards-compliant formats for mechanical test data.

### Tasks

- CWA on standards-compliant formats for mechanical test data
- Data format 1 — Uniaxial creep (Independently verified)
- Data format 2 — Creep crack growth
- Data format 3 — Creep fatigue
- Data format 4 — Creep fatigue crack growth
- Data format 5 — Material pedigree data formats v2 (Independently verified)

### Milestones

- Milestone M1— First plenary (M01)
- Milestone M2— Second plenary (M11)
- Milestone M3— CWA posted for 60 day public comment (M22)
- Milestone M4— Final plenary (M24)
- Milestone M5— CWA approved by WS members (M26)
- Milestone M6— CWA published (M28)

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### Timeframe & Deliverables

The timeframe, milestones and deliverables at the end of each stage are shown below. The number of meetings and reviews is not limited to the once scheduled below and additional meetings and reviews can be organized if needed.

		DIASM	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	M31	M32	M33	M34	M35	M36	M37	
		CENWS	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	
Milestone	Description	Month	11-16	12-16	1-17	2-17	3-17	4-17	5-17	6-17	7-17	8-17	9-17	10-17	11-17	12-17	1-18	2-18	3-18	4-18	5-18	6-18	7-18	8-18	9-18	10-18	11-18	12-18	1-19	2-19	
M1	First plenary		Meeting																												
	Data Format 1 – Uniaxial creep (Beta Version)	DF1 BV																													
	Data Format 2 – Creep crack growth (Beta Version)	DF2 BV																													
	Data Format 3 – Creep fatigue (Beta Version)	DF3 BV																													
	Data Format 4 – Creep fatigue crack growth (Beta Version)	DF4 BV																													
	CWA Working Draft 1 for information	CWA WD1																													
	CWA Working Draft 2 for review	CWA WD2																													
M2	Second plenary																														
	Data Format 1 – Uniaxial creep v1	DF1 v1																													
	Data Format 2 – Creep crack growth v1	DF2 v1																													
	Data Format 3 – Creep fatigue v1	DF3 v1																													
	Data Format 4 – Creep fatigue crack growth v1	DF4 v1																													
	Data Format 5 – Material pedigree data formats v2	DF5 v2																													
	CWA Working Draft 3	CWA WD3																													
M3	CWA for 60 day Public Comment	CWA PC																													
	Comment resolution and CWA Final Draft	CWA FD																													
M4	Final plenary																														
M5	CWA for Approval	CWA APR																													
M6	CWA Published	CWA PUB																													

- Meeting
- Tech specs development stage
- CWA editorial and review stage
- CWA publication stage

## 6. Workshop structure

### 6.1 Introduction

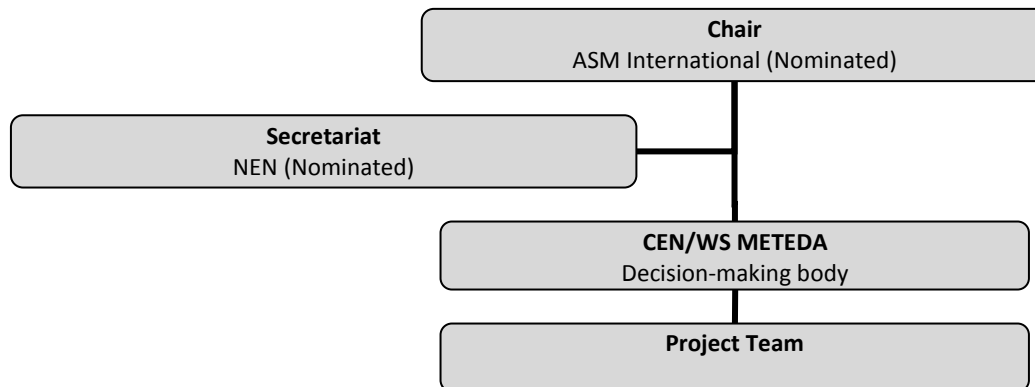
CEN Workshops are consensus working groups open to direct participation of any interested party. In practice, most participants are from industrial companies, but there are also participants from public administrations, academia and research, consumer groups, and so on.

Workshop participants can come from any country worldwide – most are European of course, but in some cases international participation can prove helpful. This Workshop is free of charge.

The Workshop documents are drafted by participating experts. The drafting of the formal output of the Workshop, in the form of a proposed publication is called a CEN Workshop Agreement (CWA), is carried out in the Workshop itself under the supervision of the chair and the support of the secretary.

### 6.2 Organization

The figure below shows the Workshop structure and the responsibilities of the main actors. Each actor is described in more detail hereafter.



#### Chair

The CEN/WS METEDA Chair is responsible for ensuring the development of the CWA respects the principles of the adopted project plan and the requirements of this document.

#### Secretariat

The CEN/WS METEDA Secretariat will provide the support needed to implement the Workshop, including: Management of meetings, Formal processing of the standardization deliverable and project management.

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The Workshop Secretariat shall bring major problems encountered in the development of the CWA to the attention of CEN CENELEC Management Centre (CCMC) in order for solutions to be found. Irrespective of the above, any CEN/CENELEC national Member may exercise the right of appeal in accordance with the CEN/CENELEC Internal Regulations - Part 2, clause 7 including where this Guidance document is not observed.

The Workshop Secretariat shall contact CCMC in cases where possible conflict could arise from adoption of a CWA project.

The Workshop Secretariat shall record the organizations/participants. In order to ensure transparency, the documents of the Workshop should be uploaded on an electronic platform (Livelink).

### CEN/WS METEDA

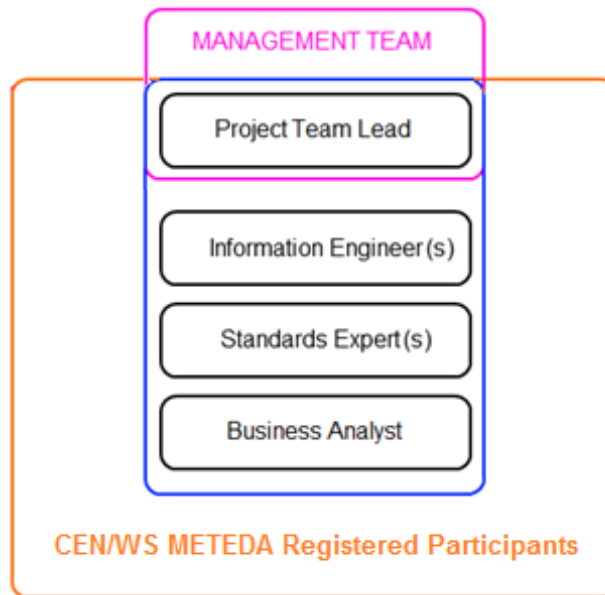
The CEN/WS METEDA plenary is the decision-making forum. It is here where the Workshop participants come together to discuss on strategic issues and comment and vote on draft deliverables and vote on the final deliverables prepared by the Project Team.

### Project team

The CEN/WS METEDA Project Team will undertake the technical work with a view to drafting of the CWA on behalf of the registered participants. The preliminary membership of the Workshop Project Team will be determined at the first plenary in anticipation of new members being recruited during the course of the Workshop.

The structure of the Workshop Project Team is consistent with the main themes of activity and is depicted in the context of the overall Workshop organization in the following figure.

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In the figure, the management team represents the Chair and the Secretariat. The Workshop registered participants will review and approve the work of the Project Team. The roles and responsibilities of individual members of the Workshop Project Team are described in the following table.

<b>Role</b>	<b>Responsibilities</b>
<b>Information Engineer</b>	<p><i>The role will require experience working in the engineering materials sector and will have experience both of materials testing and of developing engineering materials information systems.</i></p> <p><i>The Information Engineer will develop the data model and accompanying data formats using any appropriate technology.</i></p> <p><i>It is anticipated that more than one information engineer will participate in the Project Team. The information engineer will edit the CWA and be acknowledged in the document as an editor.</i></p>
<b>Standards Expert(s)</b>	<p><i>The role will require experience working in the engineering materials sector and developing materials testing standards.</i></p> <p><i>The Standards Expert will liaise with ISO with a view to establishing a common understanding of the objectives of the CEN Workshops on engineering materials data; addressing IPR issues; seeking an agreement to use the ISO Online Browsing Platform; and liaising with the relevant CEN, ISO, and ASTM TCs with a view to introducing the data formats into the relevant procedural standards.</i></p> <p><i>It is anticipated that more than one standardization expert will participate in the Project Team. The standardization expert will edit the CWA and will be acknowledged in the document as an editor.</i></p>



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<p><b>Business Analyst</b></p>	<p><i>The role will require experience assessing business processes that have been affected by the transition to web-based business models and will have experience documenting industrial sector business activities and processes.</i></p> <p><i>The Business Analyst will quantify the investments in materials testing; determine the availability of data generated by materials testing activities; examine business processes in the engineering materials sector that may be affected by formats for engineering materials data; propose interventions; and identify new business opportunities.</i></p>
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One of the experts will also act as Project Team Lead, with responsibility for co-ordinating the work of the Project Team, including the organization of regular virtual and face-to-face meetings; reporting to the Management Team; maintaining a dialog between the Project Team and the registered participants, and overseeing the delivery of the CWA.

**7. Resource requirements**

All costs related to the participation of interested parties in the Workshop's activities will be borne by themselves.

## **8. Related activities, liaisons, etc.**

Liaisons will be established with ISO/TC 164/SC 1 (Mechanical testing of metals – Uniaxial testing), ISO/TC 164/SC 5 (Fatigue testing), ASTM Committee E08 (Fatigue and Fracture) and E28 (Mechanical Testing), ECISS/TC 101 (Test methods for steel), and CEN/TC 310 (Advanced automation technologies and their applications).

The Workshop shall report regularly to CEN/TC 310, whose scope is related to the scope of this Workshop, either in person or by correspondence, highlighting the most important issues and any possible conflicts that arise.

CEN/TC 310 may also request the Workshop Secretariat to provide any specific information it might require and has the right to send one representative to Workshop meetings as an observer.

On publication, the CWA shall be submitted to the relevant CEN/CENELEC technical bodies for assessment, with a view to possible transformation into a European Standard or other CEN/CENELEC deliverable.

## **9. Contact points**

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