

Project title:

Creating knowLedge and skilLs in AddItive Manufacturing



Reference number:

2017-3309/591838-EPP-1-2017-1-ES-EPPKA2-SSA

Work Package WP06 Work Package Leader TWI Deliverable 6.3 Title: Piloting of RPL Tools



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1. Introduction

This document presents the results from the RPL pilots that were carried out during this project. The aim of the pilots was to implement and evaluate the usefulness and applicability of the the RPL guideline and tools produced during this project. All the pilots were organised to cover the different profiles and to test different CU's of each profiles. Partners selected which CU's they will offer depending on their AM speciality.

Initially RPL pilots were arranged to be delivered in face to face sessions, in this way the consortium ensured that during the pilots the candidates had access to facilities, AM equipment and practical sessions. However, in 2020, due to the Covid restrictions in different countries, the consortium agreed and obtained authorisation to carry out some pilots via online platforms with the practical part limited if required.







2. National RPL Pilots

From July 2020 to September 2020, five CLLAIM partners coordinated and delivered the pilots in Spain, Germany and the UK. In total 20 candidates attended the RPL pilots, in Spain Idonial piloted the RPL programme for the designer profile. For Germany Fraunhofer piloted the RPL for supervisor. LZH piloted the RPL for operator. In the UK, TWI and Lloyd's Register the RPL programme for the Inspector profile. The schedule for RPL pilots that each partner delivered is detailed in **Erro! A origem da referência não foi encontrada.**.

Partner	Profile	RPL Pilots / Pa	rticipants	Date
FRAUNHOFER	Supervisor	 CU00, CU01, CU08, CU15, CU22, CU46, CU47, CU48 	5 participants	28 Jul, 31 Jul, 04 Sep 2020
LZH	Operator	 CU00, CU08, CU10, CU11, CU14, CU15, CU17, CU18, CU20, CU48, CU49 	6 participants	06 – 18 Aug 2020
IDONIAL	Designer	 CU25, CU59, CU60, CU61, CU62 	5 participants	28 – 29 Sep 2020
LR/TWI	Inspector	 CU00, CU01, CU08, CU15, CU22, CU63, CU64 	4 participants	05 – 22 Oct 2020

Table 1 - RPL pilots schedule details

For the RPL pilots, partners recruited candidates with AM background. The aim of the RPL pilots was to test the 'Guideline for RPL in the AM sector' methodology and tools developed. The consortium decided to test the RPL guideline with five candidates (were possible) per AM profile, CV's from different candidates were reviewed by the consortium and each organisation selected the participants for their RPL pilots.

Once the participants were selected and the documents were submitted, the examiner reviewed their application and (where applicable) scheduled a technical interview to evaluate and validate the knowledge and industrial experience of participants. If the candidate's applications were accepted and they successfully pass the interview, the final step for candidates was to complete the exam for the CU's of their selected profile.

For all the pilots, evidence of training and attendance was recorded and the procedure for exams was encouraged in accordance with 'Procedure for pilot activities CU's and RPL' (Annex 1). Partners compiled evidence of pilots as follows:

• For RPL Pilots: Candidate application, technical interview and evidence of assessment.





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Preparation date: Jan, 2021

Revision: 0

Table 1 - Checklist to gather evidence for RPL pilots

Checklist	Documents	Responsible for organising/providing documents	Requirement	Collect evidence for RPL Pilots
Stage 0 - I	nformation on RPL Process			
	ATBs must provide candidates an information kit	Partner piloting the RPL	Mandatory	Not required
Stage 1 - D	Documentation		- '	
	AM Professional and training registration form.	Candidate	Mandatory	Required
	AM Professional and personal motivational form.	Candidate	Mandatory	Required
	CV	Candidate	Non- mandatory	Not required
	Self-assessment questionnaire grid.	Candidate	Non- mandatory	Not required
	Personal interview.	Candidate & ATB	Non- mandatory	Not required
Stage 2 - R	lecognition			
	AM Checklist portfolio.	ATB/Examiner	Mandatory	Required
	Portfolio technical review document.	ATB/Examiner	Mandatory	Required
Stage 3 - A	ssessment			
	Technical interview guide.	ATB/Examiner	Mandatory	Required
	Exam questions for each CU as required	ANB	Mandatory	Required
	Practical examination /AM demonstration.	ATB/Examiner	Mandatory	Required
Stage 4 - C	Qualification (For RPL pilots: Certi	ficate of attendance & f	feedback)	
	Attendance certificate ***	ATB/Examiner	Non- Mandatory	Not required
	Participant evaluation ** (feedback)	ATB/Examiner & candidate	Mandatory	Required
	Examiner evaluation ** (feedback)	Examiner	Mandatory	Required

Where the pilots were delivered online, the attendance list and photographic evidence was recorded using screenshots.

All participants (candidates and tutors/examiners) that attended the RPL pilots were required to provide insightful feedback.





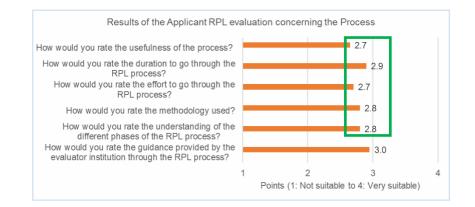


3. Pilots general evaluation results

In this section, a summary of the feedback received from RPL pilots is presented. During the pilots, an evaluation of the event was required from candidates and tutors.

3.1. **RPL Pilots evaluation results from Applicants**

For the RPL pilots 20 applicants participated in the process, completed all required documentation, CU assessments and provided insightful evaluation of their experience during the pilots. Figure 1 represents the evaluation results received from RPL participants, in general, the RPL process was scored as good, most applicants mentioned that they found the process quite long and time consuming. Partners agreed that the process requires high amount of time invested from candidates to collect evidences of their AM background and industrial experience, however these evidences ensure that the examiner has enough information to evaluate the RPL participant; partners suggested to give enough of time for applicants to gather and organised their evidences. The guidance and support provided by coordinators and examiners was highly scored with 3 out of 4 points, this result demonstrates that partners were coordinated, followed the RPL guideline and implemented the tools correctly during this process.





Results received regarding the RPL guideline were highly evaluated by applicants as shown in Figure 2. The transparency of the process and the quality of the technical interview received scores above 3 (out of 4) these results demonstrate that although the process can be long and time consuming, the end-result for candidates was well received. These results show the confidence that participants had in the process, RPL structured and qualification of examiners to evaluate and professionally recognise their AM industrial experience. The feedback received regarding the quality of the technical interview was scored as very good, some candidates mentioned that the questions were too advanced for the CU's partners agreed to review the interview questions.







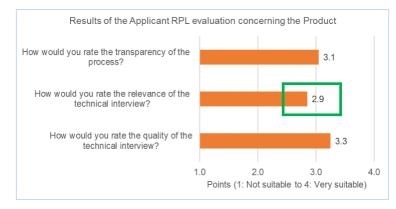


Figure 2 - RPL pilots evaluation results from applicants concerning 'the product'

3.2. RPL Pilots evaluation results from Tutors

During the RPL pilots, each partner assigned at least one examiner to carry out the RPL process and technical interviews. In total 9 examiners participated in the RPL pilots for all profiles. Figure 3 shows the evaluation results from examiners, in general the RPL process was highly evaluated by examiners for the effort invested during the pilots and the understanding of the process. Regarding the usefulness of the process and methodologies, the evaluation received was very good, examiners mentioned that the tools used during the process could be improved, it was suggested to develop automatic tools to process scores from the technical interviews to facilitate and reduce the time invested during this process. Partners agree in the implementation of an automatic score tool and this document was developed by the end of the project.

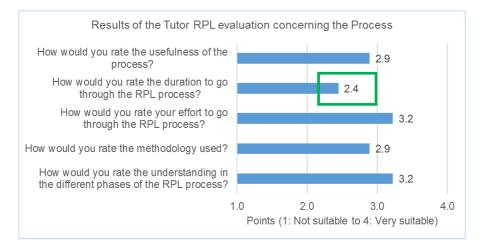


Figure 3 - RPL pilots evaluation results from tutors concerning 'the process'



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Regarding the RPL guideline available during the pilots, examiners highly evaluated the RPL process, relevance and quality of the technical interview with scores above 3 out of 4 points; these results indicate that the RPL guideline and tools were of high quality and usefulness for their future implementation in an international AM qualification system. The document quality was scored as very good, examiners mentioned that with the implementation of automatic tools the RPL guideline could be improved. The score system for the technical interview was redeveloped as an automatic tool available to examiners by the end of this project.

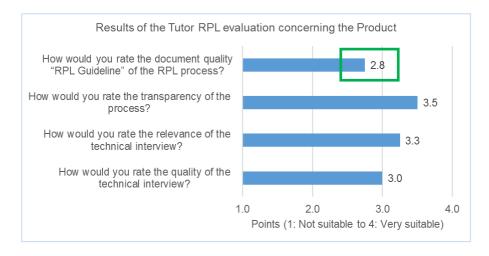


Figure 4 - RPL pilots evaluation results from tutors concerning 'the product'

From the feedback received it can be concluded that the RPL guideline was successfully implemented and accepted within AM experts (participants and examiners). The feedback received from these AM experts was valuable for this project, it validates the usability of the RPL guideline for implementation in industry and recognises the need of innovative tools to evaluate AM experts and officially recognise their AM expertise.







4. Conclusion

The main objective of the RPL pilots was to demonstrate the use and applicability of implementing RPL mechanisms aligned with the AM Qualification guidelines developed during this project. From RPL pilots feedback received, it can be concluded that:

- RPL pilots were successful and well accepted in industry and AM professionals;
- The tools were validated both by the applicants and examiners;
- The outcomes from pilots have confirmed the usability and industrial demand for the international AM qualification system, which was developed during this project.







5. Annexes

Annex 1

Procedure for pilot activities CUs and RPL

1. Introduction

This document is a guidance for the collection of evidence and evaluation (feedback) that needs to be gathered during the CU's and RPL pilots. The evidence collected during pilots is critical to assess the guality and usability of the training, methodology and tools.

For piloting CU's and RPL this procedure shall be followed using the documents that can be found in <u>WP06</u>, folder: '*D6.2 D6.3 Guidance to gather evidence and evaluation of CU'S & RPL pilots*' and to collect feedback all evaluation forms are available on <u>WP09</u>, folders: 08 & 09. These work packages and folders contain the required documentation and templates used as reference in this procedure.

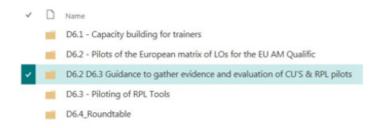


Figure 1 - WP06, Minimum requerements for evidence and evaluation for pilots

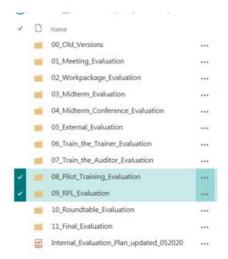


Figure 2 - WP09, Evaluation of LO's and RPL

2. Scope and targets

This procedure which covers the minimum requirements for collecting evidence of training and evaluating CU and RPL pilots, is aimed at CLLAIM project partners (VET Providers) who will be supplying training as ATB's (Authorised Training Bodies) and examination of candidates.



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3. Use of tools for recording evidence and evaluation of pilots

This guide aims to assist the instructors in collecting documents required from all **delivered training** and **implementation** of RPL during pilots.

3.1. Evidence required for CU's pilots

At the beginning of the sessions, the tutor is responsible of informing participants that evidence of their training is required, it is also responsibility of the tutor to collect all the evidence before the end of each training.

During each training, a 'training file' shall be produced, per candidate, with all the documents collected. This training file will be used as evidence of the training provided and feedback received. The following steps shall be followed to collect the required documentation:

3.1.1. Prepare the checklist

As a tool to gather all the required documents, it is recommended to have a checklist available before and during the training. An example of this document can be found in Annex 1.

3.1.2. Produce a Lesson Plan

A lesson plan that can be adapted to different AM Profiles and CU's shall be produced for each training. The lesson plan shall contain a detailed description of the activities, scheduled during training, the resources required for each activity and the contact hours covered during the day. A template for lesson plan is presented with the minimum information required, an example can be found in Annex 2.

3.1.3. Attendance list

It is **mandatory to produce an attendance list** during the training. All participants will be required to sign every day as a proof of their participation. <u>If pilots were deliver online, include screenshots</u> <u>showing participants attendance.</u>

Attendance list should include specific information regarding the training, competence unit, start date of the training, contact hours, training venue, and name and signature of the instructor in charge. A template is presented with the minimum information required, an example of this document can be found in Annex 3.





Creating knowLedge and skilLs in AddItive Manufacturing Reference number: 2017-3309/591838-EPP-1-2017-1-ES-EPPKA2-SSA Preparation date: Jan, 2021 Revision: 0 3.1.4. Evidence of assessments, candidate's answer sheet



Any results achieved by participants during the theory sessions, shall be collected as evidence of assessments. It is responsibility of the partner delivering the pilot to collect and keep the results or answer sheets of any assessment completed by the candidates. If pilots were deliver online, google forms, survey monkey or similar are acceptable to collect exam results.

At least one answer sheet or assessment results shall be provided as proof of final theory assessment. A template for evidence of assessments is presented with the minimum information required, an example of this document can be found in Annex 4.

3.1.5. Evidence of practical tasks

<u>If applicable</u>, a list of practical tasks should be produced by the candidate as a proof of training for practical exercises. This list of practical task should include sufficient details and be included in the **training file** for each participant. <u>If practical assessment was not possible</u>, include a brief justification.

An example of this document can be found in Annex 5.

3.1.6. Photographic evidence of training (optional)

It is **recommended** to gather photo-evidence during the training sessions to demonstrate: candidate's participation in training activities both practical (as appropriate) and theory sessions either classroombased or online. If pilots were deliver online, include screenshots showing participants attendance.

An example of this document can be found in Annex 6.

3.1.7. Evaluation (feedback) from pilots - Participant and Tutors

It is **mandatory** to obtain feedback from participants and to keep evidence from their training. In the case of CU pilots, it is mandatory to obtain feedback from each competence unit and encourage participants to include their comments for each CU. <u>If pilots were deliver online, google forms, survey</u> <u>monkey or similar are acceptable to collect evaluations.</u>

Tutors/Trainers are required to provide feedback and evaluate each CU delivered.







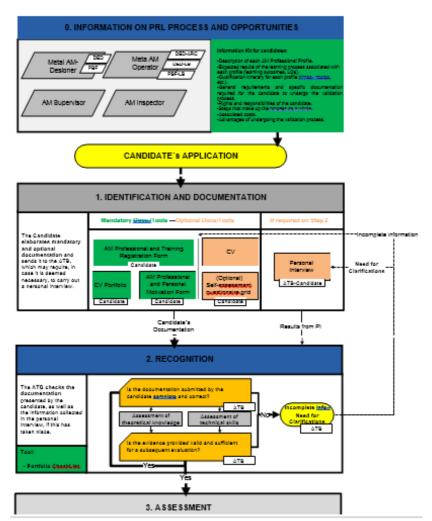
3.2. Tools for RPL pilots

Regarding RPL pilots, the examiners and partners performing RPL pilots are responsible for gathering documents from candidates participating in the RPL pilots. These documents will built the **candidate's portfolio**. It is responsibility of examiners to:

- · Verify all documents and experience presented from candidates.
- · Provide feedback of the available tools for RPL pilots.
- Collect feedback from participants of the RPL pilots.

3.2.1. RPL Process

Refer to the RPL process from the latest version of the 'Guideline for RPL in the AM sector' on WP05.





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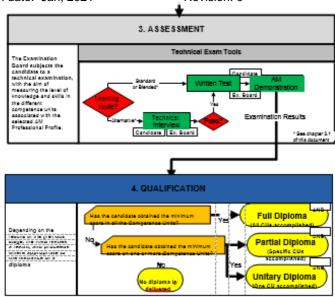


Figure 3 - RPL process proposed in the 'Guideline for RPL in the AM Sector

3.2.2. Checklist for examiners - RPL pilots

It is a highly recommended to use this tool to verify documents required during the RPL pilots. A template of this document is available on <u>WP06</u> and presented in Annex 7:Checklist for RPL examiners.

3.2.3. Evaluation from examiners and participants - RPL pilots

It is **mandatory** to obtain feedback from candidates and to record evidence of participation. Examiners are responsible to collect feedback and encourage participants to comment on their final observations. If pilots were deliver online, google forms, survey monkey or similar are acceptable to collect evaluations.

Examiners taking part in the RPL pilots are required to provide feedback. It is required to complete an evaluation at the end of each pilot activity.



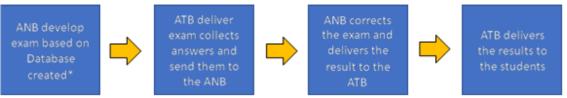




Preparation date: Jan, 2021 Revision 4. Procedure for CU & RPL exams

All partners performing CU's or RPL pilots are responsible to follow the procedure for exams as

follows:



- Each ANB (DVS, CESOL, and TWI) will be responsible to produce the exams required for the CU'S & RPL pilot activities. Database of all exam questions is available through EWF.
- ATB's (All Partners) are responsible for asking the ANB for the exam with at least one week before the examination date.
- The ANB will then make available the exam to the ATB at least two days before the examination date.
- 4. ATB conducts the exam and sends it the ANB.
- 5. The ANB has one week to correct (mark) the exam and send the results to the ATB.
- 6. ATB provides exam results to candidates.

5. Summary

- All templates required, annexes and examples presented in this document and the annexes are available in <u>WP06</u> folder D6.2_D6.3 Guidance to gather evidence and evaluation of CU'S & RPL pilots
- All evidence of pilots collected from participants shall be uploaded on SharePoint as follows:
 - ✓ CU Pilots: Upload evidence on WP06, folder D6.2
 - ✓ RPL Pilots: Upload evidence on WP06, folder D6.3
- All evaluation (feedback) collected from participants and tutors during the CU's and RPL pilots shall be scanned and uploaded on SharePoint <u>WP09</u>, using folder 08 for CU Pilots, folder 09 for RPL pilots.
- Once pilot activities are completed, update the status on the pilots schedule excel file <u>WP06</u>.







Annex 1: Check list - CU Pilots



1

6. Annexes

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	Document title	Documents required	Notes
☑	Lesson plan	1 per training	
V	Attendance list If pilots were deliver online, include screenshots showing participants	1 per training	
	Evidence of assessments, candidate's answer sheet If pilots were deliver online, google forms, survey monkey or similar are acceptable to collect exam results.	1 per candidate	
Ø	Evidence of practical tasks, (if applicable) If practical assessment was not possible, include a brief justification in this form	1 per candidate	
Ø	Photographic evidence of training If pilots were deliver online, include screenshots showing participants	1 per training	
Ø	Feedback from training Evaluation form available on <u>WP09</u> .	1 per candidate	

Figure 4 - Example of checklist







Annex 2: Lesson Plan – CU pilots

Competence Unit: Total contact hours Start time: End time: Date: Tutor/Trainer/Lecturer/Group: Partner: e.g. CU01 e.g. 14 hrs e.g. e.g. 09:00 16:00 14/FEB/2020 e.g. TWI e.g. TWI Time schedule Objectives Activity Resources Student evaluation hours Contact hours e.g. 09:00 - 09:30 e.g. Personal introductions Introduction Classroom, n/a .5 e.g. 09:30 - 10:00 e.g. Course introduction and objectives, general information about venue, safety information and administration Prosentation Projector assestment .5 e.g. 10:00 - 11:00 e.g. Additive Manufacturing Processes Overview Power point presentation Projector assestment 2 i::::::::::::::::::::::::::::::::::::	Creating knowLedge and skilLs in Additive Manufacturing Reference number: 2017-3309/591535-EPP:1-2017-1-ES-EPPKA3-SSA						rogramme			
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16:00 - 17:00 End of day assessment (10 questions) Test choice questions - 1 Contact hours										
	16:00 - 17:00	End of day assessmen	t (10 ques	tions)		1	Test	choice		1
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	Lesson reflection/imp	provents:								

Figure 5 - Example of Lesson Plan, part I





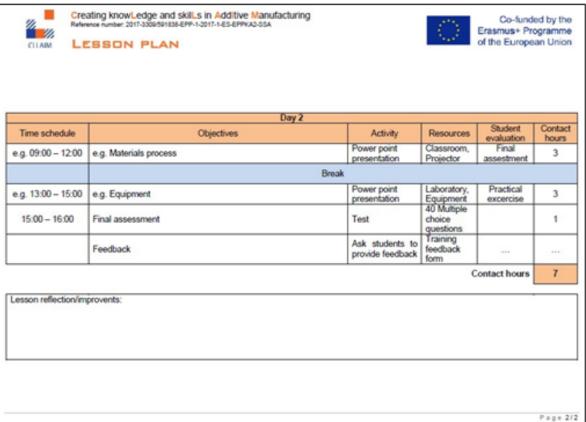


Figure 6 -- Example of Lesson Plan, part II



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Annex 3: Attendance list - CU pilots



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Competence Unit:	Start day:	Contact hours:	Training venue:	Instructor's name and signature
e.g. CU01	e.g. 14/FEB/2020	14 hrs	e.g. TWI, Cambridge UK	

#	Candidate's name	Employer	Day 1 e.g. 14/FEB/2020	Day 2 e.g. 15/FEB/2020	Day 3	Day 4	Day 5
1	e.g. Yo yo	e.g. TWI	e.g. Signature	e.g. Signature	e.g. N/A	e.g. N/A	e.g. N/A
2							
3							
4							
5							
6							
7							
8							
9							
10							

Figure 7 - Example of attendance list







Annex 4: Evidence of assestments (for theory)



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EVIDENCE OF ASSESSMENT

Candidate's answer sheet

Competence Unit:	Start day:	Training venue:
e.g. CU01	e.g. 14/FEB/2020	e.g. TWI, Cambridge UK

Question	Candidate's answer	Question	Candidate's answer	Question	Candidate's answer	Question	Candidate's answer
1.	e.g. A	11.	e.g. A	21.		31.	
2.	e.g. B	12.	e.g. B	22.		32.	
3.	e.g. C	13.	e.g. C	23.		33.	
4.	e.g. A	14.	e.g. A	24.		34.	
5.	e.g. B	15.	e.g. B	25.		35.	
6.	e.g. C	16.	e.g. C	26.		38.	
7.	e.g. A	17.	e.g. A	27.		37.	
8.	e.g. B	18.	e.g. B	28.		38.	
9.	e.g. C	19.	e.g. C	29.		39.	
10.	e.g. A	20.	e.g. A	30.		40.	

Type of assessment	Score
e.g. Final test	e.g. 10/20 = 50%

	Comments				
E.g. due to low score, candidate was offered extra support to ensure understanding of the content.					
Candidate's name:					
Signature:					
Date:					
Instructor's name:					

instructor's name:	
Signature:	
Date:	



Figure 8 - Example evidence of assestment



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Annex 5: Evidence of tasks (for practical excercises)



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EVIDENCE OF TASKS

Competence Unit:	Start day:	Training venue:
e.g. CU01	e.g. 14/FEB/2020	e.g. TWI, Cambridge UK

Date:	Description of task completed during training
e.g. 14/FEB/2020	e.g. calibrate equipment

Candidate's name:	
Signature:	
Date:	

Instructor's name:	
Signature:	
Date:	



Figure 9 - Example evidence of tasks





Annex 6: Photographic evidence of training







CU01; Venue: TWI; Date: 14/02/2020





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LPBF Operator training; Venue: TWI; Date: 14/02/2020

Candidates calibrating equipment

Training venue





Figure 10 - Example photo-evidence of training



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Annex 7: Checklist for RPL examiners

Creating knowl.edge and skills in Additive Manufacturing Reference number: 2017-3309/591838-EPP-1-2017-1-ES-EPPKA2-SSA





Checklist for examiner - RPL pilot

Checklist	Documents	Responsible for organising/providing documents	Requirement	Collect evidence for RPL Pilots
Stage 0 - Inf	formation on RPL Process			
	ATBs must provide candidates an information kit	Partner piloting the RPL	Mandatory	Not required
Stage 1 - Do	cumentation			
	AM Professional and training registration form (Annex1*)	Candidate	Mandatory	Required
	AM Professional and personal motivational form (Annex2*)	Candidate	Mandatory	Required
	cv	Candidate	Non-mandatory	Not required
	Self-assessment questionnaire grid (Annex4*)	Candidate	Non-mandatory	Not required
	Personal interview (Annex3)	Candidate & ATB	Non-mandatory	Not required
Stage 2 - Re	cognition			
	AM Check-list portfolio (Annex5*)	ATB/Examiner	Mandatory	Required
	Portfolio technical review document (Annex 6*)	ATB/Examiner	Mandatory	Required
Stage 3 - As	sessment			
	Technical interview guide (Annex 7*)	ATB/Examiner	Mandatory	Required
	Exam questions for each CU as required	ANB	Mandatory	Required
	Practical examination /AM demonstration (Annex8*, Annex9*)	ATB/Examiner	Mandatory	Required
Stage 4 - Qu	alification (For RPL pilots: Certificate of attendance & feedback)			
	Attendance certificate ***	ATB/Examiner	Non-Mandatory	Not required
	Participant evaluation ** (feedback)	ATB/Examiner & candidate	Mandatory	Required
	Examiner evaluation ** (feedback)	Examiner	Mandatory	Required

*All annexes can be found in WPO5 within the latest version of the 'Guideline for RPL in the AM sector

** All templates for evaluation can be found on WP09

*** Attendance certificate - Template available on WP06

Examiner's name and signature:
Company/Partner:
Date:
Venue:
Applicant's name:



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Figure 11 – Checklist for examiner – RPL pilots

