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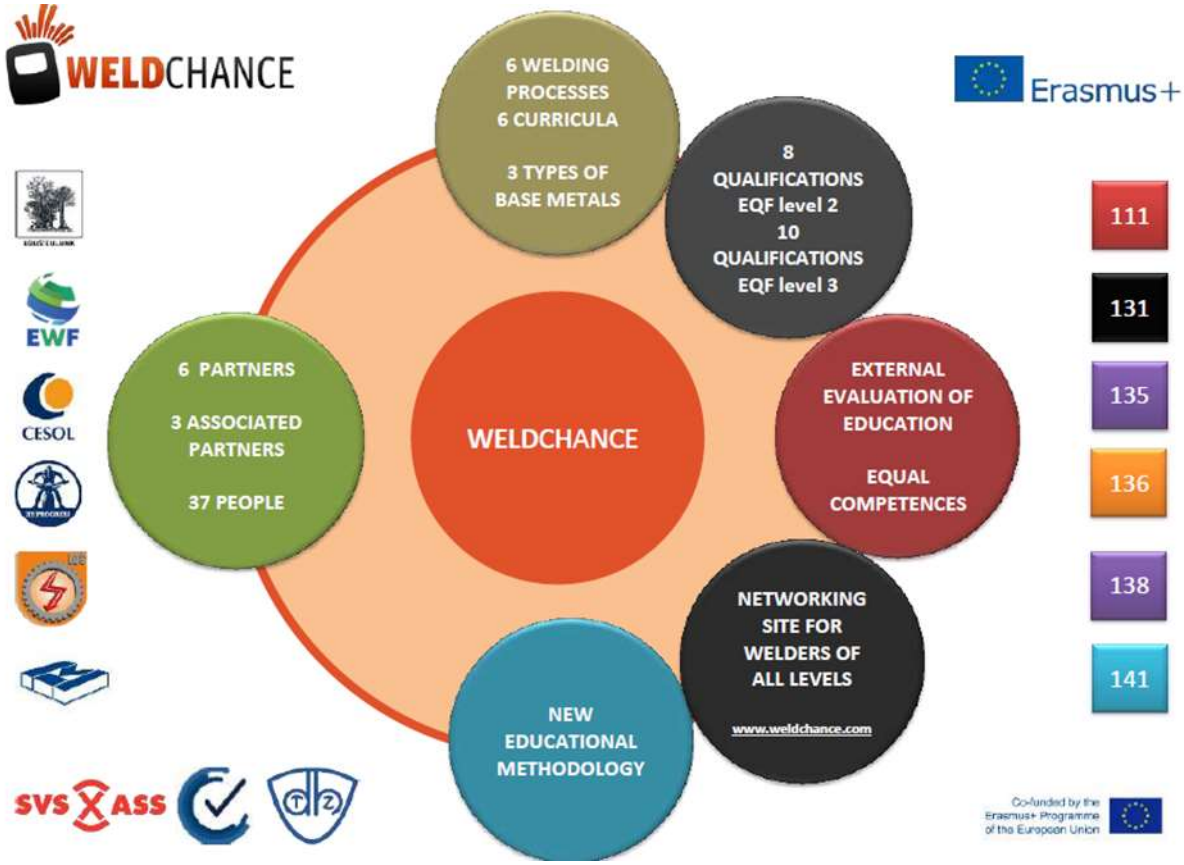
Qualification standard ARC WELDER 3



Qualification standard ARC WELDER 3

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List of abbreviations:

CEN – European Committee for Standardization

EN – European Standards

EQF – European Qualifications Framework

IAB – International Authorization Board

IT – Information Technology

ISO – International Organization for Standardization

NQF – National Qualifications Framework

VET – Vocational Education and Training

VWTS – Virtual Welding Training System

WPS – Welding Procedure Specification

Welding arc processes (EN ISO 4063)**:**

MMA (111) - manual metal arc welding

MIG (131) – Metal Inert Gas - welding with solid wire electrode

MAG (135) – Metal Active Gas - welding with solid wire electrode

FCAW (136) – Flux-Cored Arc Welding – MAG welding with flux cored electrode

MCAW (138) – Metal-cored Arc Welding - MAG welding with metal cored electrode

TIG (141) – Tungsten Inert Gas - welding with solid - filler material (wire/rod)

Welding positions:

PA - flat position

PB - horizontal vertical position

PC - horizontal position

PD - horizontal overhead position

PE - overhead position

PF - vertical up position

PG - vertical down position

H-L045 - inclined position welding upwards

J-L045 - inclined position welding downwards

PH - pipe position for welding upwards

PJ - pipe position for welding downwards

Weld details:

BW - Butt weld

FW - Fillet weld

PW – Plate weld

ss – single-side welding

mb - material backing

nb - welding with no material backing

gb - gas backing

fb - flux backing

bs - welding from both sides

ci - consumable insert

sl - single layer

ml - multi-layer

lw - leftward welding

rw - rightward welding

Non-Destructive Testing (NDT):

MT – Magnetic Particle Testing

PT – Liquid Penetrant Testing

RT – Radiographic Testing

UT – Ultrasonic Testing

VT – Visual Testing

Contents.....

Note:Nouns used in this document such as participant, welder, student, employer, teacher imply gender difference.

1. Basic qualification characteristics

1.1. Qualification name

Arc welder 3

1.2. Qualification level

EQF 3

1.3. Minimum qualification volume

180 ECVET points

1.4. Reference learning pathway

Using the convention concerning ECVET points, the number of ECVET points for the qualification is defined (one year = 60 ECVET points).

The qualification Arc Welder 3 is allocated 180 ECVET points according to the reference learning pathway: 3-year vocational school. In consequence, the qualification is allocated 180 ECVET points even though the training/education can be implemented through a shorter or longer pathway (see Figure 1 below).

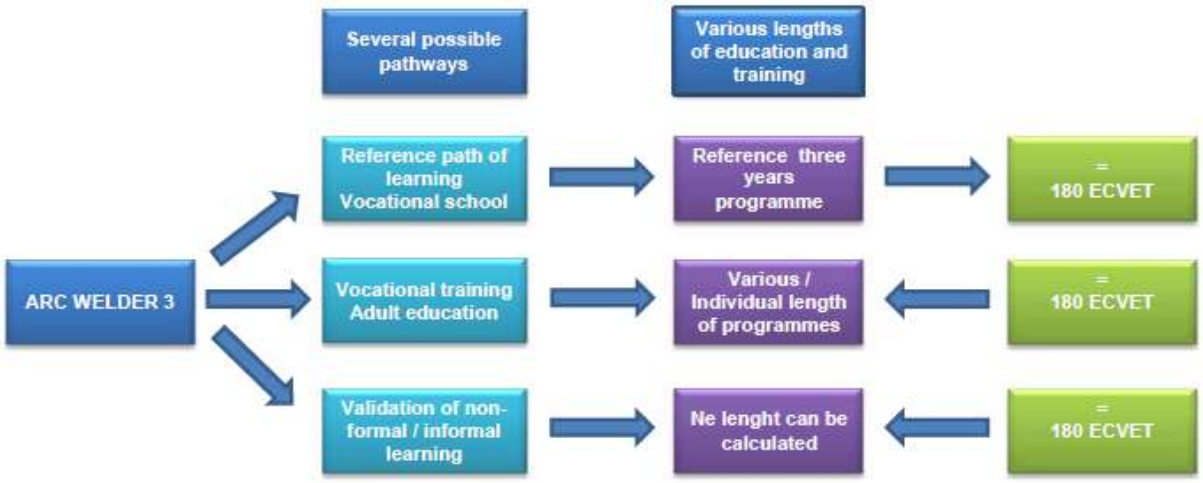


Figure 1: Reference learning pathway for Arc welder 3

1.5. Qualification class

Complete

2. Qualification elements

2.1. Competences and learning outcomes

General competences:

- Participates in oral and written communication or group discussion, reads and synthetizes information from the documents on the same subject

- Applies acquired mathematical knowledge in life and profession necessary for understanding of regularities in nature and society

- Applies acquired knowledge of digital communication

- Applies digital applications in work environment and private life

- Applies knowledge of foreign languages in general and professional communication

- Applies the acquired learning methods and perfects new ones

- Takes responsibility for the task implementing one's own plan in order to accomplish the goals at hand.

Professional competences:

- Review technical-technological documentation

- Plan the execution of welding process for a specific task

- Plan the work space

- Prepare, position and check the welding equipment

- Receive, handle and maintain consumables

- Prepare, check and protect materials and work area ready for welding.

- Position the work piece for welding

- Adjust welding parameters according to WPS

- Prepare the edges of base metal for welding process

- Control pre-heat and inter-pass temperature

- Weld the joint according to WPS and apply welding techniques when executing different types of welded joints in different welding positions

- Clean the weld, base metal and work place

- Fill in the work order

- Fill in the delivery/return note for the material

- Take records regarding the state of tools, equipment, machines and protective equipment

- Exchange information with all stakeholders in work process

- Take part in resolution of problems that occurred during job execution

- Use professional terminology in mother tongue and foreign language

- Carry out visual inspection and dimensional control of welded joints

- Mark/label welds with their identification tags in accordance with the quality assurance system.

- Include elements of self-control in accordance with the quality assurance system.

- Complete and check the finished weld ready for inspection and report into the production control system.

- Apply regulations and means for occupational safety, fire protection and environment protection

Qualification standard constituents for obtaining the qualification Arc welder 3

STRUCTURE		YEARS OF EDUCATION						ARC WELDER 3
		First year	ECVET	Second year	ECVET	Third year	ECVET	TOTAL ECVET
			60		60		60	**180**
A.	**General educational part** Described in 2.2.1.	20 %	**12**	20 %	**12**	20 %	**12**	**36**
B.	**Vocational part**	77 %	**46**	77 %	**46**	77 %	**46**	**138**
B.1	Theoretical part -vocational modules Described in 2.2.2.	24 %	11	19 %	9	16 %	7	27
B.2	Practical part – vocational modules Described in 2.2.2.	59 %	27	71 %	32	74 %	34	93
B.3	Psychophysical part Described in 2.2.2.	4 %	2	4 %	2	4 %	2	6
B.4	Optional vocational modules Described in 2.2.3.	13 %	6	6 %	3	6 %	3	12
C.	**FINAL EXAM** Described in 2.2.4.	3 %	**2**	3 %	**2**	3 %	**2**	**6**

2.2.1. Obligatory units of learning outcomes from general subjects

Code	Name	Level	ECVET
I Language and communication field			
Mother tongue			
	Listening		
	Reading		
	Speaking (Speech interaction + speech production)		
	Writing		
Foreign language			
	Listening		
	Reading		
	Speaking (Speech interaction + speech production)		
	Writing		
II. Mathematical field:			
Mathematics			
	Numbers		
	Algebra and simple functions		
	Shape and space		
	Measurements		
III. Digital field:			
Digital technologies			
	Knowledge and use of ICT		
	Computer networks and internet		
	Work with applications		
IV. Physical education field:			
Physical education			
	Kinesiology theory		
TOTAL:			**36**

2.2.2. Obligatory vocational units of learning outcomes (85% of total share of vocational units of learning outcomes)

Code	Name	Level	ECVET
I Theoretical Part			
TP-M1	Arc welding process	2	
TP-M2	Weldability of Ferritic Steels	2	
TP-M3	Weldability of Austenitic Stainless Steels	2	
TP-M4	Weldability of Aluminum and its alloys	2	
TP-M5	Welding application and quality	2	
TP-M6	Health and Safety	2	
TP-M19	Weldability: Cr-Mo steel, nickel steel, other stainless steels, cast irons (according to ISO/TR 15608 – Groups 5, 6, 7, 9, 10)	3	
TP-M20	Fabrication of welded structures	3	
TP-M21	Flame and mechanical straightening	3	
TP-M22	Repairing of welds	3	
TP-M23	Introduction to mechanized, automatic and robotic welding	3	
		TOTAL	**27**

II Practical Part

Preparation for welding			
PP-M7	Preparation for welding	2	
PP-M7.1	Preparation for welding with MMA process	2	
PP-M7.2	Preparation for welding with MIG/MAG process	2	
PP-M7.3	Preparation for welding with TIG process	2	

Welding processes

M8 - MMA Welding for Ferritic steels: Carbon and Low Alloy steel			
PP-M8.1	Introduction to Fillet Welds	2	
PP-M8.2	Fillet Welds	2	
PP-M8.3	Introduction to Plate (Butt) Welds	2	
PP-M8.4	Plate (Butt) Welds	2	
PP-M8.5	Introduction to Tube Welds	3	
PP-M8.6	Tube Welds	3	
ARC WELDER 3 – MMA (111) Welding for Ferritic steels		**TOTAL:**	**93**

Code	Name	Level	ECVET
M9 - MMA Welding for Stainless steels			
PP-M9.1	Introduction to Fillet Welds	2	
PP-M9.2	Fillet Welds	2	
PP-M9.3	Introduction to Plate (Butt) Welds	2	
PP-M9.4	Plate (Butt) Welds	2	
PP-M9.5	Introduction to Tube Welds	3	
PP-M9.6	Tube Welds	3	
ARC WELDER 3 – MMA (111) Welding for Stainless steels		**TOTAL:**	**93**

M10 - MAG Welding for Ferritic steels: Carbon and Low Alloy steel			
PP-M10.1	Introduction to Fillet Welds	2	
PP-M10.2	Fillet Welds	2	
PP-M10.3	Introduction to Plate (Butt) Welds	2	
PP-M10.4	Plate (Butt) Welds	2	
PP-M10.5	Introduction to Tube Welds	3	
PP-M10.6	Tube Welds	3	
ARC WELDER 3 – MAG (135) & MCAW (138) Welding for Ferritic steels **TOTAL**:			**93**

M11 - MAG Welding for Stainless steels			
PP-M11.1	Introduction to Fillet Welds	2	
PP-M11.2	Fillet Welds	2	
PP-M11..3	Introduction to Plate (Butt) Welds	2	
PP-M11.4	Plate (Butt) Welds	2	
PP-M11.5	Introduction to Tube Welds	3	
PP-M11.6	Tube Welds	3	
ARC WELDER 3 – MAG (135) & MCAW (138) Welding for Stainless steels **TOTAL**:			**93**

M12 – MIG Welding for Aluminum			
PP-M12.1	Introduction to Fillet Welds		
PP-M12.2	Fillet Welds		
PP-M12.3	Introduction to Plate (Butt) Welds		
PP-M12.4	Plate (Butt) Welds		
ARC WELDER 3 – MIG (131) Welding for Aluminum		**TOTAL**:	**93**

Code	Name	Level	ECVET
M13 - FCAW Welding for Ferritic steels: Carbon and Low Alloy steel			
PP-M13.1	Introduction to Fillet Welds	2	
PP-M13.2	Fillet Welds	2	
PP-M13.3	Introduction to Plate (Butt) Welds	2	
PP-M13.4	Plate (Butt) Welds	2	
PP-M13.5	Introduction to Tube Welds	3	
PP-M13.6	Tube Welds	3	
ARC WELDER 3 – FCAW (136) Welding for Ferritic steels		**TOTAL:**	**93**

M14 - FCAW Welding for Stainless steels			
PP-M14.1	Introduction to Fillet Welds	2	
PP-M14.2	Fillet Welds	2	
PP-M14.3	Introduction to Plate (Butt) Welds	2	
PP-M14.4	Plate (Butt) Welds	2	
PP-M14.5	Introduction to Tube Welds	3	
PP-M14.6	Tube Welds	3	
ARC WELDER 3 – FCAW (136) Welding for Stainless steels		**TOTAL:**	**93**

M15 - TIG Welding for Ferritic steels: Carbon and Low Alloy steel			
PP-M15.1	Introduction to Fillet Welds	2	
PP-M15.2	Fillet Welds	2	
PP-M15.3	Introduction to Plate (Butt) Welds	2	
PP-M15.4	Plate (Butt) Welds	2	
PP-M15.5	Introduction to Tube Welds	3	
PP-M15.6	Tube Welds	3	
ARC WELDER 3 – TIG (141) Welding for Ferritic steels		**TOTAL:**	**93**

M16 - TIG Welding for Stainless steels			
PP-M16.1	Introduction to Fillet Welds	2	
PP-M16.2	Fillet Welds	2	
PP-M16.3	Introduction to Plate (Butt) Welds	2	
PP-M16.4	Plate (Butt) Welds	2	
PP-M16.5	Introduction to Tube Welds	3	
PP-M16.6	Tube Welds	3	
ARC WELDER 3 – TIG (141) Welding for Stainless steels		**TOTAL:**	**93**

Code	Name	Level	ECVET
M17 - TIG Welding for Aluminum			
PP-M17.1	Introduction to Fillet Welds	3	
PP-M17.2	Fillet Welds	3	
PP-M17.3	Introduction to Plate (Butt) Welds	3	
PP-M17.4	Plate (Butt) Welds	3	
PP-M17.5	Introduction to Tube Welds	3	
PP-M17.6	Tube Welds	3	
ARC WELDER 3 – TIG (141) Welding for Aluminum		**TOTAL:**	**93**

III Psychophysical part

M18 – Aerobic training			
PPP-M18.1	Physical training (Kinesiology activities)	3	
PPP-M18.2	My body and I (Transformation of welders' anthropological characteristics)	3	
PPP-M18.3	Healthy living (Kinesiology methods for health improvement)	3	
		TOTAL:	**6**

2.2.3. Elective vocational units of learning outcomes (15% of total share of vocational units of learning outcomes)

Elective vocational units are elected by the individual, the employer or the company according to their own demands and are chosen from the part 2.2.2. - Obligatory vocational units of learning outcomes.

The total share must not exceed 15% of total share of vocational units of learning outcomes.

Maximum volume for Elective vocational units of learning outcomes is 12 ECVET points.

2.2.4. Final exam

Code	Name	Level	Volume
	Final exam	2	**6**

2.2.5. Learning paths for individual qualifications within Arc welder 3:

The learning path for each qualification in Arc welder 3 is defined in the following diagram:

By combining the modules from previous tables, one gets the corresponding learning path for qualification Arc welder 3. Each of the eight qualifications within Arc welder 3 is different based on the welding process and base material that is welded. The joint characteristic of all the qualifications is that three types of welded joints are trained and learned – fillet, butt (plate) and tube weld in all welding positions.

In accordance with the above stated, for each qualification within EQF 3 the learning path is different in part B (B1 + B2 + B3) or B (2.2.2.).

The elective part B (B4) or B (2.2.3.) is chosen by the individual, the employer or the institution exclusively from the part B (B1 + B2 + B3) or B (2.2.2.).

When creating national curricula at national levels, and in case they wish to apply this concept that results in a competent welder both at national and international level, the public authorities have to stick to the premise that suggested occupational standards, qualification standards and curricula represent the minimum of necessary activities for obtaining a competent welder and that it is necessary to embed all the units of learning outcomes into their curricula. In doing so, they have been given total freedom in determining the volume of individual learning outcomes with the recommendation that the total ratio between individual parts and units in the total sum of ECVET points not be changed.

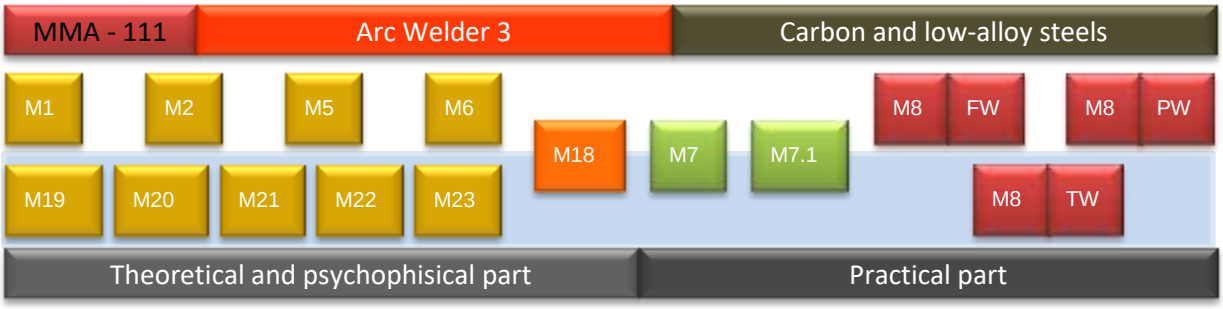
Here it is important to point out that the qualification Arc welder 3 can be obtained in two ways:

1. After the completed elementary school when all the modules that are depicted in the scheme are in the learning path or

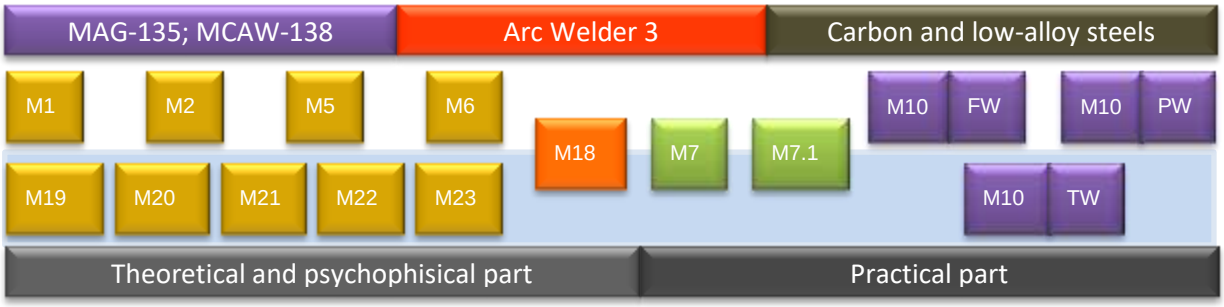
2. After completed qualification Arc welder 2 when the modules from the lower row of the scheme depicted in light blue are in the learning path.

The learning paths for individual qualifications within Arc welder 3 for part B (B1 + B2 + B3) have been demonstrated in following schemes:

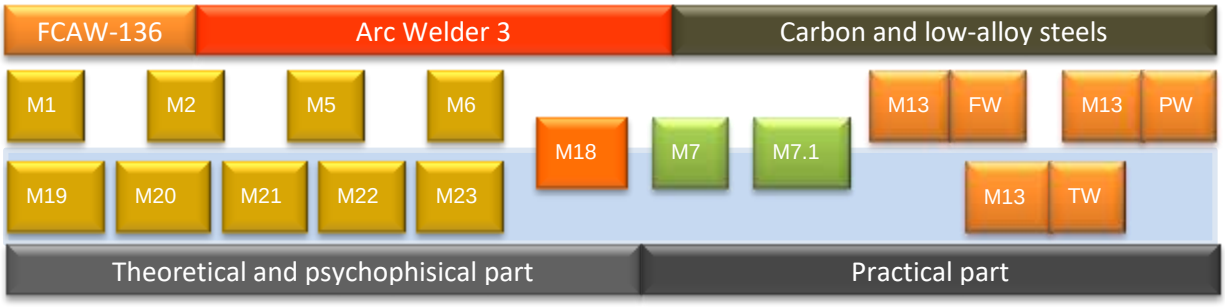
9. Arc welder 3 – welding process: MMA – 111 - Carbon and low-alloy steels (93 ECVET):



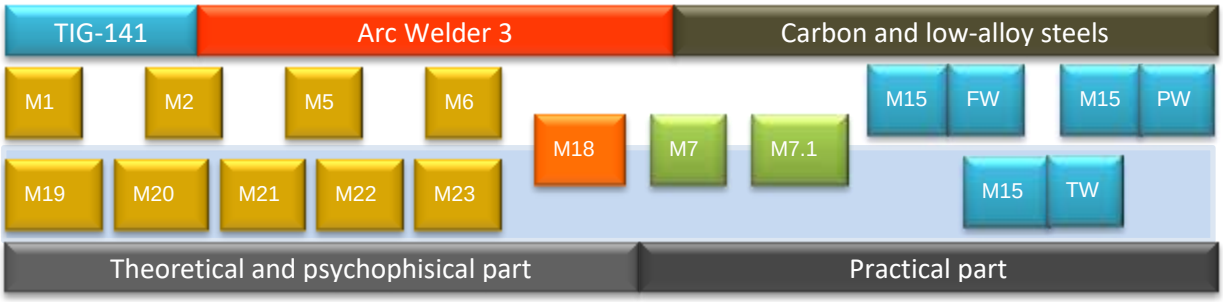
10. Arc welder 3 – welding process: MAG-135; MCAW-138 - Carbon and low-alloy steels (180 ECVET):



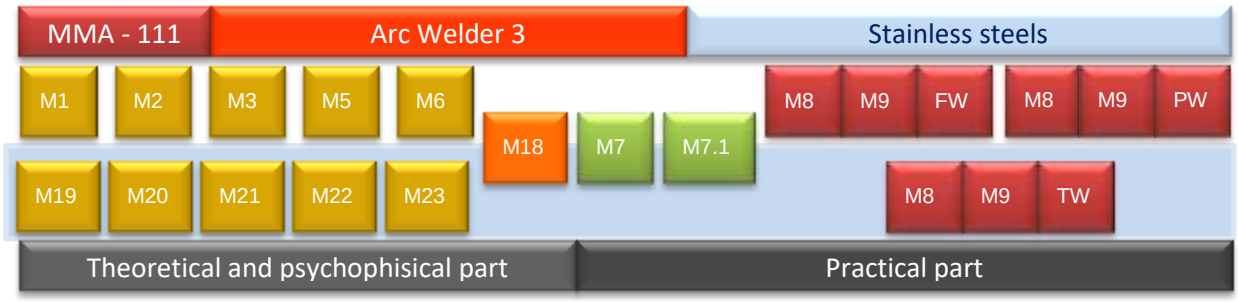
11. Arc welder 3 – welding process: FCAW-136 - Carbon and low-alloy steels (180 ECVET):



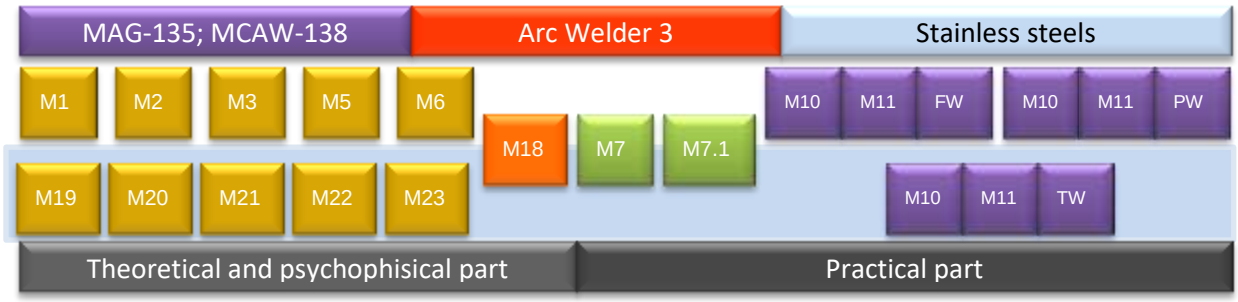
12. **Arc welder 3** – welding process: TIG-141 - Carbon and low-alloy steels:



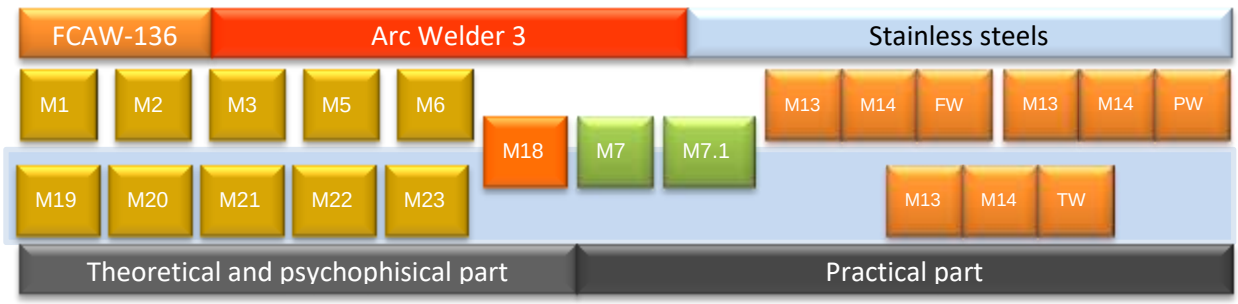
13. **Arc welder 3** – welding process: MMA – 111 - Stainless steels:



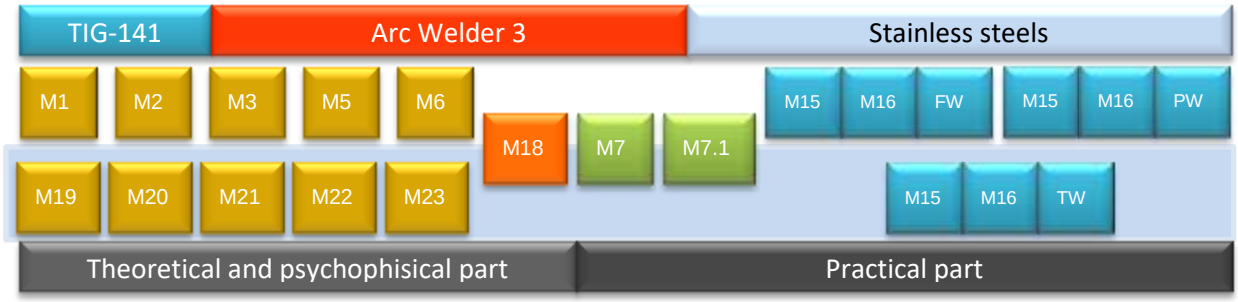
14. **Arc welder 3** – welding process: MAG-135; MCAW-138 - Stainless steels



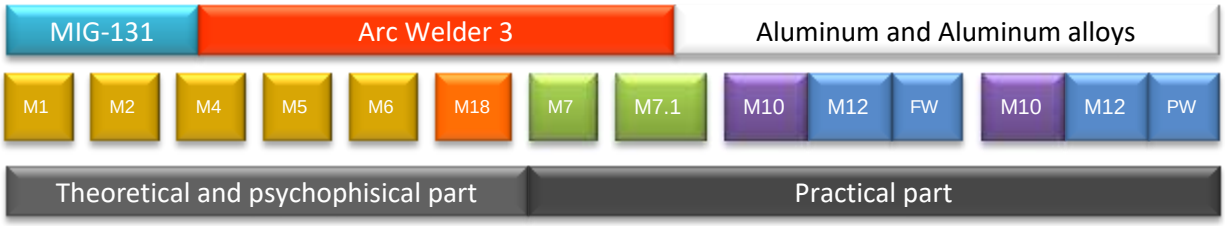
15. **Arc welder 3** – welding process: FCAW-136 - Stainless steels:



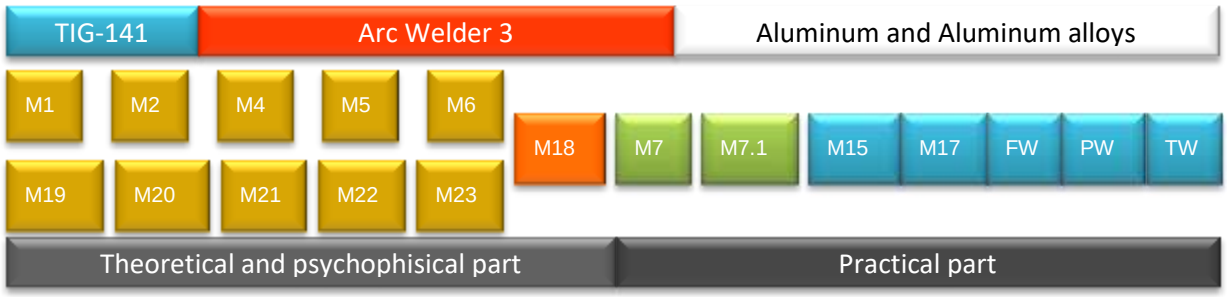
16. **Arc welder 3** – welding process: TIG-141 - Stainless steels:



17. **Arc welder 3** – welding process: MIG-131 – Aluminum and Aluminum alloys:



18. **Arc welder 3** – welding process: TIG-141 – Aluminum and Aluminum alloys:



2.2.3. Elective vocational units of learning outcomes (15% of total share of vocational units of learning outcomes)

Elective vocational units are elected by the individual, the employer or the company according to their own demands and are chosen from the part 2.2.2. - Obligatory vocational units of learning outcomes.

The total share must not exceed 15% of total share of vocational units of learning outcomes.

Maximum volume for Elective vocational units of learning outcomes is 12 ECVET points.

2.2.4. Final exam

Code	Name	Level	Volume
	Final exam	2	**6**

2.3. Elaboration of units of learning outcomes

2.3.1. Obligatory units of learning outcomes from general subjects

The recommendation is that the obligatory units of learning outcomes from general subjects contain the following: Mother tongue, foreign language, Mathematics, Digital technologies and Physical education. The maximum number of ECVET points is 36 for both years of education.

The national bodies responsible for national curricula are allowed to expand the number of subjects according to national criteria as long as the total sum of ECVET points for three years of education does not exceed 36.

2.3.2. Obligatory vocational units of learning outcomes

2.3.2.1. Theoretical vocational units of learning outcomes

M19	WELDABILITY: CR-MO STEEL, NICKEL STEEL, OTHER STAINLESS STEELS, CAST IRONS (ISO/TR 15608 – GROUP 5, 6, 7, 9, 10)

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to steel	3	
2	Weldability of steels	3	
3	Materials: Cr-Mo steel, nickel steel, other stainless steels, cast irons (ISO/TR 15608 – group 5, 6, 7, 9, 10)	3	

No.	TPM19 / 1
Name	Introduction to steel
Level	3
Volume	
Objective/purpose of unit of learning outcome	Summarise the basis of welding steel
Learning outcomes (5-10)	1. Outline the essentials of weldability of each group, heat input, preheating, post weld treatment. 2. Compare applicable welding processes. 3. Describe the correct handling of appropriate consumables in workshop 4. Identify the imperfections characteristic and explain how to avoid them. 5. Outline typical problems when welding each family of alloys.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Classroom with enough seating places, Internet, LCD projector. - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

No.	TPM19 / 2
Name	Weldability of steels
Level	3
Volume	
Objective/purpose of unit of learning outcome	Summarise the specific effects of welding heat on steel.
Learning outcomes (5-10)	1. Name the influence of alloying elements on the properties of weldable steel. 2. Describe the effect of plate thickness on the properties of weldable steel. 3. Explain the influence of carbon equivalent. 4. Interpret the heat input concept and its use.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Classroom with enough seating places, Internet, LCD projector. - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

No.	TPM19 / 3
Name	Materials: Cr-Mo steel, nickel steel, other stainless steels, cast irons (ISO/TR 15608 – group 5, 6, 7, 9, 10)
Level	3
Volume	
Objective/purpose of unit of learning outcome	Outline the most important materials and their behaviour
Learning outcomes (5-10)	1. Identify different kinds of materials such as Cr – Mo steels, Nickel steels, Other stainless steels and Cast irons.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Classroom with enough seating places, Internet, LCD projector. - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

M20 FABRICATION OF WELDED STRUCTURES (WELDING SEQUENCE)

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Fabrication of welded structures (welding sequence)	3	

No.	TPM20 / 1
Name	Fabrication of welded structures (welding sequence)
Level	3
Volume	
Objective/purpose of unit of learning outcome	Explain fabrication of welded structures (welding sequence)
Learning outcomes (5-10)	1. Outline the appropriate welding sequence to avoid distortion. 2. Explain the importance of assembly and previous deformation to avoid distortion. 3. Identify the clamping tools to manipulate the structure. 4. Interpret technical documents such as specifications for fabrication.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Classroom with enough seating places, Internet, LCD projector. - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

M 21 FLAME AND MECHANICAL STRAIGHTENING

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Flame and mechanical straightening	3	

No.	TPM20 / 1
Name	Flame and mechanical straightening
Level	3
Volume	
Objective/purpose of unit of learning outcome	Explain flame and mechanical straightening
Learning outcomes (5-10)	1. Explain the principles of flame and mechanical straightening 2. Identify equipment for flame and mechanical straightening 3. Compare flame and mechanical straightening of different materials 4. Define heating techniques. 5. Outline the health and safety risks regarding flame and mechanical straightening.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Classroom with enough seating places, Internet, LCD projector. - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

M 22 REPAIRING OF WELDS

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Repairing of welds	3	

No.	TPM20 / 1
Name	Repairing of welds
Level	3
Volume	
Objective/purpose of unit of learning outcome	Explain repair welds
Learning outcomes (5-10)	1. Outline the problems of making repair welds 2. Recognize possible hazards likely to occur in making repair welds particularly for in-service repair 3. Demonstrate use of comprehensive procedures to be applied to weld repairs
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Classroom with enough seating places, Internet, LCD projector. - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

M 23 INTRODUCTION TO MECHANIZED, AUTOMATIC AND ROBOTIC WELDING

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to mechanized, automatic and robotic welding	3	

No.	TPM20 / 1
Name	Introduction to mechanized, automatic and robotic welding
Level	3
Volume	
Objective/purpose of unit of learning outcome	Explain the difference between mechanized, automatic and robotic welding
Learning outcomes (5-10)	1. Explain the difference between mechanized, automatic and robotic welding 2. Recognize the differences in joint preparation between manual and mechanized, automatic and robotic welding. 3. Outline the advantages of mechanized, automatic and robotic welding.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Classroom with enough seating places, Internet, LCD projector. - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

2.3.2.2. Practical vocational units of learning outcomes

M7 Preparation for welding - PR

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Methods of preparation for welding	2	
2	Welded joints in plates	2	
3	Welded joints in pipes	2	
4	Preparation of work place and operative work	2	

No.	PRM7 / B.1
Name	Methods of preparation for welding
Level	2
Volume	
Objective/purpose of unit of learning outcome	Know the available methods for joint preparation for welding.
Learning outcomes (5-10)	1. Outline methods used for joint preparation and their specific application. 2. Explain essential parameters and results of thermal cutting (plasma and flame cutting). 3. Select suitable cutting and gouging processes for the main types of steel.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Welding workshop at the educational institution and / or at the employer's - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

No.	PRM7 / B.2
Name	Welded joint in plates
Level	2
Volume	
Objective/purpose of unit of learning outcome	Know the basics of welded joints and their terminology

Learning outcomes (5-10)	1. Identify different types of welds and joints (plate weld, fillet weld, plate joint, T-joint, lap joint and corner joint). 2. Identify characteristics of welds such as throat thickness, leg length, penetration, and number of runs. 3. Identify single- and multi-run welds, excess weld metal, weld profile. 4. Name different types of joint preparations and their main dimensions.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Welding workshop at the educational institution and / or at the employer's - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

No.	**PRM7 / C.1**
Name	Welded joint in pipes
Level	2
Volume	
Objective/purpose of unit of learning outcome	Know the different connections in pipe welding
Learning outcomes (5-10)	1. Identify the following joint preparations: I-, V-, X-, and U- preparations. 2. Identify and draft tube to plate welds, branch connections. 3. Describe the different methods for joint preparation of pipes.
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Welding workshop at the educational institution and / or at the employer's - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

M7.1 Preparation for welding with MMA process

No.	PRM7.1
Name	Preparation for welding with MMA process
Level	2
Volume	
Objective/purpose of unit of learning outcome	1. Prepare the work place 2. Prepare the operative work
Learning outcomes (5-10)	1. Prepare the work place 2. Prepare the operative work for welding with MMA process
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Welding workshop at the educational institution and / or at the employer's - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

M7.2 Preparation for welding with MIG/MAG process

No.	PRM7.2
Name	Preparation for welding with MIG/MAG process
Level	2
Volume	
Objective/purpose of unit of learning outcome	1. Prepare the work place 2. Prepare the operative work
Learning outcomes (5-10)	1. Prepare the work place 2. Prepare the operative work for welding with MIG/MAG process
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Welding workshop at the educational institution and / or at the employer's - Recommendation: allow the students/participants to use their smartphones

	during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

M7.3 Preparation for welding with TIG process

No.	PRM7.3
Name	Preparation for welding with TIG process
Level	2
Volume	
Objective/purpose of unit of learning outcome	1. Prepare the work place 2. Prepare the operative work
Learning outcomes (5-10)	1. Prepare the work place 2. Prepare the operative work for welding with TIG process
Conditions in which competences are acquired	1. According to national legislation and valid pedagogical standards for vocational education. 2. Minimum conditions for occupation Arc welder: - Welding workshop at the educational institution and / or at the employer's - Recommendation: allow the students/participants to use their smartphones during classes (calculation of parameters, apps for parametres, games such as Weldplay, etc.)
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation.
Example of testing and evaluation	Create corresponding questions from each learning unit according to national pedagogical standards

Welding processes

Material

Ferritic steels: Carbon and Low Alloy steel

M8	MMA Welding for Ferritic steels: Carbon and Low Alloy steel	Process 111

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to MMA Welding of Ferritic Steels	2	
2	Introduction to Tube Welds	2	
3	Tube Welds	2	

No.	PPWPM8 / MMA
Name	Introduction to MMA Welding of Ferritic Steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 111 (MMA welding).
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for ferritic steels. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 40 %). - By traditional training (minimum 60 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of

	approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS.

	- How to grind a tungsten electrode. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples. .

No.	**PPWPM8.5 / MMA**
Name	Introduction to Tube Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 111 (MMA welding) and to be able to produce single sided butt welds in pipe in PA, PC, PH positions.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS. 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make fillet welds in different types of joints in single and multi-run technique. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform preparation with grinding tools 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (electrode holder, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 40 %). - By traditional training (minimum 60 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated,

	validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

No.	PPWPM8.6 / MMA
Name	Tube Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 111 (MMA welding) and to be able to produce single sided butt welds in pipe in PH and H-L045 positions.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS. 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make fillet welds in different types of joints in single and multi-run technique. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform preparation with grinding tools 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (electrode holder, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 40 %). - By traditional training (minimum 60 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active

	in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

M10	MAG Welding for Ferritic steels: Carbon and Low Alloy steel	Process 135/138

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to MAG (Process 135 or 138) Welding of Ferritic Steels	2	
2	Introduction to Tube Welds	3	
3	Tube Welds	3	

No.	PPWPM10 / MAG
Name	Introduction to MAG (Process 135 or 138) Welding of Ferritic Steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 135 or 138 (MAG welding).
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 5. Maintain the welding equipment (welding torch, cables, etc.). 6. Select suitable tools, jigs and work place for ferritic steels. 7. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on

	equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - How to grind a tungsten electrode. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples. .

No.	PPWPM10.5 / MAG
Name	Introduction to Fillet Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (135 and 138) and to be able to make single sided butt welds in pipe in PA, PC and PH positions.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the

	welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

No.	**PPWPM10.6 / MAG**
Name	Tube Welds
Level	2
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (135 and 138) and to be able to produce single sided butt welds in pipe in H-L045 position.

Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

M13 FCAW Welding for Ferritic steels: Carbon and Low Alloy steel — Process 136

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to MAG / FCAW (Process 136) Welding of Ferritic Steels	2	
2	Introduction to Tube Welds	2	
3	Tube Welds	2	

No.	PPWPM13 / MAG / FCAW
Name	Introduction to MAG / FCAW (Process 136) Welding of Ferritic Steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 136 (MAG welding).

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 5. Maintain the welding equipment (welding torch, cables, etc.). 6. Select suitable tools, jigs and work place for ferritic steels. 7. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in

	practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - How to grind a tungsten electrode. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples. .

No.	**PPWPM13.5 / MAG / FCAW**
Name	Introduction to Tube Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (136) and to be able to make single sided butt welds in pipe in PA, PC and PH positions.

Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

No.	**PPWPM13.6 / MAG / FCAW**
Name	Fillet Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (136) and to be able to produce single sided butt welds in pipe in H-L045 position.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and	1. Testing: - during classes according to national legislation and regulations for vocational education,

evaluation	2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

M15	TIG Welding for Ferritic steels: Carbon and Low Alloy steel	Process 141

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to TIG (Process 141) Welding of Ferritic Steels	2	
4	Introduction to Tube Welds	3	
5	Tube Welds	3	

No.	PPWPM15 / TIG
Name	Introduction to TIG (Process 141) Welding of Ferritic Steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 141 (TIG welding).

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 5. Maintain the welding equipment (welding torch, cables, etc.). 6. Select suitable tools, jigs and work place for ferritic steels. 7. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in

	practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - How to grind a tungsten electrode. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples. .

No.	**PPWPM15.1 / TIG**
Name	Introduction to Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG-welding) and to be able to produce single sided butt welds in pipe in PA, PC, PH and H-L045 positions using relatively thick materials.

Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

No.	**PPWPM15.6 / TIG**
Name	Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG-welding) and to be able to produce single sided butt welds in pipe in PA, PC, PH and H-L045 positions using relatively thin materials.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation

	of welder education, in front of an authorized independent institution for implementation of evaluation.
	3. Minimum requirements for welding training
	
	Training requirements:
	
	- The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers.
	- The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose.
	- Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition.
	- Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662).
	- Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination.
	
	Teachers/instructors requirements:
	
	- Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB.
	- Instructors teaching practical skills shall have either:
	  o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or
	  o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or
	  o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or
	  o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training.
	- Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge).
	
	Authorised Examiner requirements:
	
	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner.
	- ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist.
	- The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to

	weld. **Practical examination:** - Check the correct selection of welding rod for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

Material
Stainless steel

M9	MMA Welding for Stainless steels	Process 111

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to MMA Welding of Stainless Steels	2	
4	Introduction to Tube Welds	3	
5	Tube Welds	3	

No.	PPWPM9 / MMA
Name	Introduction to MMA Welding of Stainless Steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 111 (MMA welding).

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (electrode holder, cables, etc.). 7. Select suitable tools, jigs and work place for stainless steels. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 40 %). - By traditional training (minimum 60 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or

	○ Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples. .

No.	**PPWPM9.5 / MMA**
Name	Introduction to Tube Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 111 (MMA welding) and to be able to produce single sided butt welds in pipe in PA, PC, PH positions.

Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS. 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make fillet welds in different types of joints in single and multi-run technique. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform preparation with grinding tools 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (electrode holder, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 40 %). - By traditional training (minimum 60 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

No.	**PPWPM9.6 / MMA**
Name	Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 111 (MMA welding) and to be able to produce single sided butt welds in pipe in PH and H-L045 positions.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS. 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make fillet welds in different types of joints in single and multi-run technique. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform preparation with grinding tools 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (electrode holder, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 40 %). - By traditional training (minimum 60 %). - By recognition of previous training or work experience.
Testing	1. Testing:

and evaluation	- during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MMA welding doing a visual inspection of different samples.

M11 MAG Welding for Stainless steels — Process 135/138

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to MAG (Process 135 or 138) Welding of Stainless Steels	2	
2	Introduction to Tube Welds	2	
3	Tube Welds	2	

No.	PPWPM10 / MAG
Name	Introduction to MAG (Process 135 or 138) Welding of Stainless Steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 135 or 138 (MAG welding).

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 5. Maintain the welding equipment (welding torch, cables, etc.). 6. Select suitable tools, jigs and work place for ferritic steels. 7. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in

	practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MAG welding doing a visual inspection of different samples.

No.	**PPWPM11.5 / MAG**
Name	Introduction to Tube Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (135 and 138) and to be able to make single sided butt welds in pipe in PA, PC and PH positions.

Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MAG welding doing a visual inspection of different samples.

No.	**PPWPM11.6 / MAG**
Name	Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (135 and 138) and to be able to produce single sided butt welds in pipe in H-L045 position.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.

Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MAG welding doing a visual inspection of different samples..

M14 FCAW Welding for Stainless steels Process 136

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to MAG (Process 136) Welding of Stainless steels	2	
2	Introduction to Tube Welds	3	
3	Tube Welds	3	

No.	PPWPM14 / MAG / FCAW
Name	Introduction to MAG (Process 136) Welding of Stainless steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 136 (MAG welding).

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 5. Maintain the welding equipment (welding torch, cables, etc.). 6. Select suitable tools, jigs and work place for ferritic steels. 7. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in

	practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for FCAW welding doing a visual inspection of different samples..

No.	**PPWPM14.5 / MAG / FCAW**
Name	Introduction to Tube Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (136) and to be able to make single sided butt welds in pipe in PA, PC and PH positions.

Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for FCAW welding doing a visual inspection of different samples..

No.	**PPWPM14.6 / MAG / FCAW**
Name	Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MAG welding process (136) and produce fillet welds in tube-to-plate joints in PB, PH and PD positions..
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and	1. Testing: - during classes according to national legislation and regulations for vocational education,

evaluation	2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld stainless steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld stainless steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for FCAW welding doing a visual inspection of different samples..

M16 TIG Welding for Stainless steels Process 141

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to TIG (Process 141) Welding of Stainless steels	2	
4	Introduction to Tube Welds	3	
5	Tube Welds	3	

No.	PPWPM16 / TIG
Name	Introduction to TIG (Process 141) Welding of Stainless steels
Level	2
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 141 (TIG welding).

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 5. Maintain the welding equipment (welding torch, cables, etc.). 6. Select suitable tools, jigs and work place for ferritic steels. 7. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in

	practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - How to grind a tungsten electrode. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for TIG welding doing a visual inspection of different samples. .

No.	**PPWPM16.5 / TIG**
Name	Introduction to Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG-welding) and to be able to produce single sided butt welds in pipe in PA, PC, PH and H-L045 positions using relatively thick materials.

Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - How to grind a tungsten electrode. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for TIG welding doing a visual inspection of different samples.

No.	**PPWPM16.2 / TIG**
Name	Tube Welds
Level	2
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG-welding) and to be able to produce single sided butt welds in pipe in PA, PC, PH and H-L045 positions using relatively thin materials.
Learning outcomes (5-10)	1. Adjust the welding parameters according to the WPS 2. Apply instructions from WPS (joint preparation, welding sequence, pre-heating, etc.) 3. Make plate welds in different types of joints in single and multi-run technique. (According to the table below) 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control 5. Perform root face and gap preparation with grinding tools. 6. Analyze mistakes done during welding. 7. Correct the mistakes (welding technique or imperfection). 8. Maintain the welding equipment (welding torch, cables, etc...)

Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding ferritic steel. - Describe the types of electrode that exist and their applications. - Explain the function of grinding the electrode according to the current choice to weld. **Practical examination:** - Check the correct selection of tungsten electrode, welding rod or wire and shielding gas for a specific job according to the appropriate WPS. - How to grind a tungsten electrode. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate electrode to weld ferritic steels in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld ferritic steels in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for TIG welding doing a visual inspection of different samples.

Material
Aluminum

M12	MIG Welding for Aluminum	Process 131

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to MIG (Process 131) Welding of Aluminum	3	
2	Introduction to Fillet Welds	3	
3	Fillet Welds	3	
4	Introduction to Plate (Butt) Welds	3	
5	Plate (Butt) Welds	3	

No.	PPWPM12 / MIG
Name	Introduction to MIG (Process 131) Welding of Aluminum
Level	3
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 131 (MIG welding).

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 5. Maintain the welding equipment (welding torch, cables, etc.). 6. Select suitable tools, jigs and work place for ferritic steels. 7. Implement the appropriate necessities for the storage and the cleanliness of the consumables.
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in

	practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

No.	**PPWPM12.1 / MG**
Name	Introduction to Fillet Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in the MIG welding process (131) and to be able to produce fillet welds in plate in PA, PB, PF and PG positions.

Learning outcomes (5-10)	1. Adjust the welding power source to fit the purpose. 2. Control the welding power source efficiently. 3. Make fillet welds in different types of joints as specified in the table below in single and multi run technique. 4. Visually inspect his/her own work and take appropiate action resulting from that inspection and deal with problems within his/her control 5. Analyze mistakes done during welding. 6. Correct the mistakes (welding technique or imperfection). 7. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:**

	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

No.	**PPWPM12.2 / MIG**
Name	Fillet Welds
Level	3
Volume	75 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MIG welding process (131) and produce fillet welds in plate in PD position and in tube-to-plate joints in PB, PH and PD positions.
Learning outcomes (5-10)	1. Adjust the welding power source to fit the purpose. 2. Control the welding power source efficiently. 3. Make fillet welds in different types of joints as specified in the table below in single and multi run technique. 4. Visually inspect his/her own work and take appropiate action resulting from that inspection and deal with problems within his/her control 5. Analyze mistakes done during welding. 6. Correct the mistakes (welding technique or imperfection). 7. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing	1. Testing:

and evaluation	- during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

No.	**PPWPM12.3 / MIG**
Name	Introduction to Plate (Butt) Welds
Level	3
Volume	60 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MIG welding process (131) and to be able to produce single sided butt welds with backing and double sided butt welds with root opening in plate in PA and PF positions..
Learning outcomes (5-10)	1. Adjust the welding power source to fit the purpose. 2. Control the welding power source efficiently. 3. Make fillet welds in different types of joints as specified in the table below in single and multi run technique. 4. Visually inspect his/her own work and take appropiate action resulting from that inspection and deal with problems within his/her control 5. Analyze mistakes done during welding. 6. Correct the mistakes (welding technique or imperfection). 7. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training

	Training requirements: - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld.

	Practical examination: - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples

No.	**PPWPM12.4 / MIG**
Name	Plate (Butt) Welds
Level	2
Volume	60 hours
Objective/purpose of unit of learning outcome	To obtain experience in the MIG welding process (131) and to be able to produce single sided butt welds with backing in plate in PC and PE positions and double sided butt welds with root opening in plate in PB, PC, PD, PE and PF positions.
Learning outcomes (5-10)	1. Adjust the welding power source to fit the purpose. 2. Control the welding power source efficiently. 3. Make fillet welds in different types of joints as specified in the table below in single and multi run technique. 4. Visually inspect his/her own work and take appropiate action resulting from that inspection and deal with problems within his/her control 5. Analyze mistakes done during welding. 6. Correct the mistakes (welding technique or imperfection). 7. Maintain the welding equipment (welding torch, cables, etc...)
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated,

	validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a

	good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

M17	TIG Welding for Aluminum	Process 141

Units of learning outcomes

No.	Name	Level EQF	Volume ECVET
1	Introduction to TIG (Process 141) Welding of Aluminum	3	
2	Introduction to Fillet Welds	3	
3	Fillet Welds	3	
4	Introduction to Plate (Butt) Welds	3	
5	Plate (Butt) Welds	3	
6	Introduction to Tube Welds	3	
7	Tube Welds	3	

No.	PPWPM17 / TIG
Name	Introduction to TIG (Process 141) Welding of Aluminum
Level	3
Volume	10 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in using the machine and equipment for process 141 (TIG welding).
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for aluminum. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables
Conditions in which competences are acquired	- By virtual training (up to 60 %). - By traditional training (minimum 40 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution

	for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding.

	- Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

No.	**PPWPM17.1 / TIG**
Name	Introduction to Fillet Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain basic experience in process 141 (TIG welding) and to be able to make fillet welds in plate in PA, PB and PF positions
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for aluminum. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables
Conditions in which competences are acquired	- By virtual training (up to 60 %). - By traditional training (minimum 40 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training

	Training requirements: - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld.

	Practical examination: - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

No.	**PPWPM17.2 / TIG**
Name	Fillet Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	. To obtain experience in process 141 (TIG-welding) and produce fillet welds in plate in PD position and in tube-to-plate joints in PB, PD and PH positions using both single and multiple layer technique.
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for aluminum. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables
Conditions in which competences are acquired	- By virtual training (up to 60 %). - By traditional training (minimum 40 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items

	must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the "IIW Guideline International Welder" shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses.

	- Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

No.	**PPWPM12.3 / MIG**
Name	Introduction to Plate (Butt) Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG welding) and to be able to produce single side butt welds in plate in PA and PC positions.
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for aluminum. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables
Conditions in which competences are acquired	- By virtual training (up to 60 %). - By traditional training (minimum 40 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination.

	Teachers/instructors requirements:
	
	- Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB.
	- Instructors teaching practical skills shall have either:
	  o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or
	  o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or
	  o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or
	  o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training.
	- Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge).
	
	Authorised Examiner requirements:
	
	- All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner.
	- ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist.
	- The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples

No.	PPWPM17.4 / TIG
Name	Plate (Butt) Welds
Level	2
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG welding) and to be able to produce single side butt welds in plate in PE and PF position.
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for aluminum. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables
Conditions in which competences are acquired	- By virtual training (up to 60 %). - By traditional training (minimum 40 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or

	○ An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or ○ Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

No.	**PPWPM17.5 / TIG**
Name	Introduction to Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG welding) and to be able to produce single side butt welds in plate in PE position...

Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for aluminum. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables
Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge).

	Authorised Examiner requirements: - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined
Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples

No.	**PPWPM17.6 / TIG**
Name	Tube Welds
Level	3
Volume	50 hours
Objective/purpose of unit of learning outcome	To obtain experience in process 141 (TIG-welding) and to be able to produce single sided butt welds in pipe in PA, PC, PH and H-L045 positions using relatively thick materials.
Learning outcomes (5-10)	1. Apply the instructions from WPS (joint preparation, welding sequence, pre-heating, etc.). 2. Adjust the welding parameters according to the WPS. 3. Perform safe welding according to the WPS and using the necessary PICs. 4. Perform root face and gap preparation with grinding tools. 5. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control. 6. Maintain the welding equipment (welding torch, cables, etc.). 7. Select suitable tools, jigs and work place for aluminum. 8. Implement the appropriate necessities for the storage and the cleanliness of the consumables

Conditions in which competences are acquired	- By virtual training (up to 50 %). - By traditional training (minimum 50 %). - By recognition of previous training or work experience.
Testing and evaluation	1. Testing: - during classes according to national legislation and regulations for vocational education, 2. Evaluation - Writing and defending of Final paper according to the Framework for external evaluation of welder education, in front of an authorized independent institution for implementation of evaluation. 3. Minimum requirements for welding training **Training requirements:** - The welder training workshop must include the number of training booths required to cover the maximum number of students. The booths must be fully equipped, have correct ventilation and proper screening to protect other workers. - The range of welding and auxiliary equipment must reflect the scope of approval and must be in sufficient quantity to cover the maximum number of students. It must be in good working order and fit for its purpose. - Protective clothing and eye protection for trainees must be provided. Such items must be clean and in safe, good condition. - Instruments for checking welding parameters must be available and calibrated, validated or verified as appropriate (see e.g ISO17662). - Reference standards according to appendix 1 of the “IIW Guideline International Welder” shall be available for students during theoretical education and examination. **Teachers/instructors requirements:** - Teachers for theoretical education shall at least have an International Welding Specialist diploma or equivalent qualification that shall be assessed and approved by the ANB. - Instructors teaching practical skills shall have either: o A valid ISO 9606 certificate, or skill qualifications based on equivalent technical conditions, appropriate to the scope of training provided or o An International Welding Practitioner diploma (covering the welding processes subject to teaching) and active in the field of welding in the last 3 years or o An IW-diploma, covering the appropriate level (IFW,IPW or ITW), the welding processes and parent material subject to teaching, and active in the field or welding in the last 3 years or o Instructor who at least the last 5 years has worked as instructor in practical welding will be evaluated by the ANB. If approved, he/she can work as International Welder Instructor for practical training. - Teachers and instructors shall demonstrate competence in instructional techniques (transfer of practical skills and theoretical knowledge). **Authorised Examiner requirements:** - All practical examinations that can lead to the award of an IW diploma (examinations after modules 4 and 6) shall be conducted under the general supervision of the ANB Authorised Examiner. - ANB Authorised Examiners shall be qualified to at least the level of International Welding Specialist. - The Authorised Examiner can be part of the ATB providing that he/she is independent of the training of the person being examined

Example of testing and evaluation	**Oral examination:** - Describe the major components of welding equipment and their function. - Name the essential parameters for arc welding. - Explain the importance of the polarity and its change when it comes to welding aluminum - Describe the types of electrode wire that exist and their applications. - Explain the function of grinding the electrode wire according to the current choice to weld. **Practical examination:** - Check the correct selection of wire and shielding gas for a specific job according to the appropriate WPS. - Dismantling and assembling of the equipment. - Know about the importance of controlling heat input and interpass temperature welding different types of joints in single and multi-run technique and different thickness, selecting the appropriate welding parameters. - Choose the appropriate wire to weld aluminum in different welding positions and different thicknesses. - Choose the appropriate shielding gas to weld aluminum in different welding positions and different thicknesses. - Apply the knowledge acquired by traditional and virtual training to make a good joint according the acceptance criteria. - Identify the most typical imperfections for MIG welding doing a visual inspection of different samples.

2.3.3. Elective vocational units of learning outcomes

The recommendation is that the participants, employers or the institution choose something from the contents Obligatory vocational units of learning outcomes for elective subjects, bearing in mind that the competences are supplemented in the already chosen modules. In other words, that the modules for MMA and ferritic steels are supplemented with modules for stainless steel.

The number of ECVET points must not exceed 12 for both years of education.

3. Elements for qualification quality assurance

3.1. Conditions for entering qualification acquisition

Level 1 according to EQF

3.2. Justification of introduction of qualification

Justification of introduction of qualification is based on the market, ethical, technological and economical justification. European employment analyses emphasize there is personnel demand in sectors connected to the joining technologies that are involved in almost all products in all industrial branches. Globally speaking arc welder is an occupation high in demand.

Justification of introduction of suggested qualifications is based on the following points:

1. The application of qualificatons defined in such a way lands itself to the possibility of networking of international and national qualifications for arc welders, which is very significant for their mobility at European and world labor market.

2. Programs defined in such a way and testing using external evaluation enable harmonization of welder competences regardless of the institution or the country where the welder is trained. Competences obtained in such a way will be applicable at both European and world labor market.

3. Preparing welders for the labor market, such qualifications put a special emphasis on acquiring the necessary level of general competences in mother tongue, professional foreign language, mathematics and digital competences.

4. Welder competeneces are profiled according to the labor market demands.

5. Special emphasis in qualification acquisition is acquisition of the necessary psychophysical abilities of welders to work in conditions defined by this very demanding job.

Educating welders in such a way at national levels will enable their quick and effective inclusion in European and world labor market.

3.3. Role of qualification

Continuance of education:

- In horizontal sense there is a possibility of additional education for the reamaining arc welding processes,

- In vertical sense there is a possibility of acquiring the qualifications European Welding Practitioner (EWP) and European Welding Specialist (EWS).

Labor market:

- All the industries that use welding technology in fabrication of their products, from steel structures to petrochemistry, from pressure vessels to space ships, from medicine to nanotechnology.

3.4. Competent institutions that issue the public document on acquired qualification

Authorized institution

4. Document references

4.1. Reference numbers

2016-1-HR01-KA202-022187 – OSAW3

4.2. Contact persons:

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