IIW Guideline for International Welder

Minimum Requirements for the Education, Examination and Qualification

IAB-089r0-22 – Part III

MINIMUM REQUIREMENTS FOR THE EDUCATION, TRAINING, EXAMINATION AND QUALIFICATION FOR:

INTERNATIONAL WELDER
(IW)

This Guideline, Part III, is an additional route established for Experienced Welders in a specific Industrial field

Guideline of the International Institute of Welding

INTERNATIONAL AUTHORISATION BOARD (IAB)
Prepared by IAB Group A, WG A#3a

Part III

Prepared and issued by the IAB-International Authorisation Board based on the EWF above mentioned guidelines
Under the authority of the IIW-International Institute of Welding

For more information regarding the Qualifications System, the IAB/EWF Management Team or the National ANB should be contacted
(see in the IIW and EWF sites the ANB contacts)

Published by: Management Team
C/o: ISQ
Av. Prof. Dr. Cavaco Silva, 33
Taguspark – Apartado 012
P-2741-901 Porto Salvo
Portugal

Tel: +351.21 5815200
E-mail: ewf@isq.pt
Web Sites: www.iiwelding.org
www.ewf.be

Table of contents Part III

Preface

This document is based upon the European Welder series (former docs. EWF-452, EWF-467, EWF-480 and EWF-481), as developed by the European Federation for Welding, Joining and Cutting (EWF), through an Agreement first signed on 19 July 1997, at the Annual Meeting of the International Institute of Welding (IIW) in San Francisco, California, USA, and which has been further developed since then. It is established in that Agreement that the International Welder Diploma is equivalent to the European Welder Diploma within the same scope.

This Guideline is split up into three Parts, I, II and III.
Part I is dealing with the comprehensive scheme for educating welders.
Part II it is optional and provides details on test objects and WPSs to be used for test object examination.
Part III covers the route for qualification of experienced welders

Any EWF ANB is permitted to issue EWF diplomas equivalent to IIW ones that have been issued by the same ANB (Automatic Route).

Copies of this document are available from the IIW IAB Secretariat or their designated distributor.

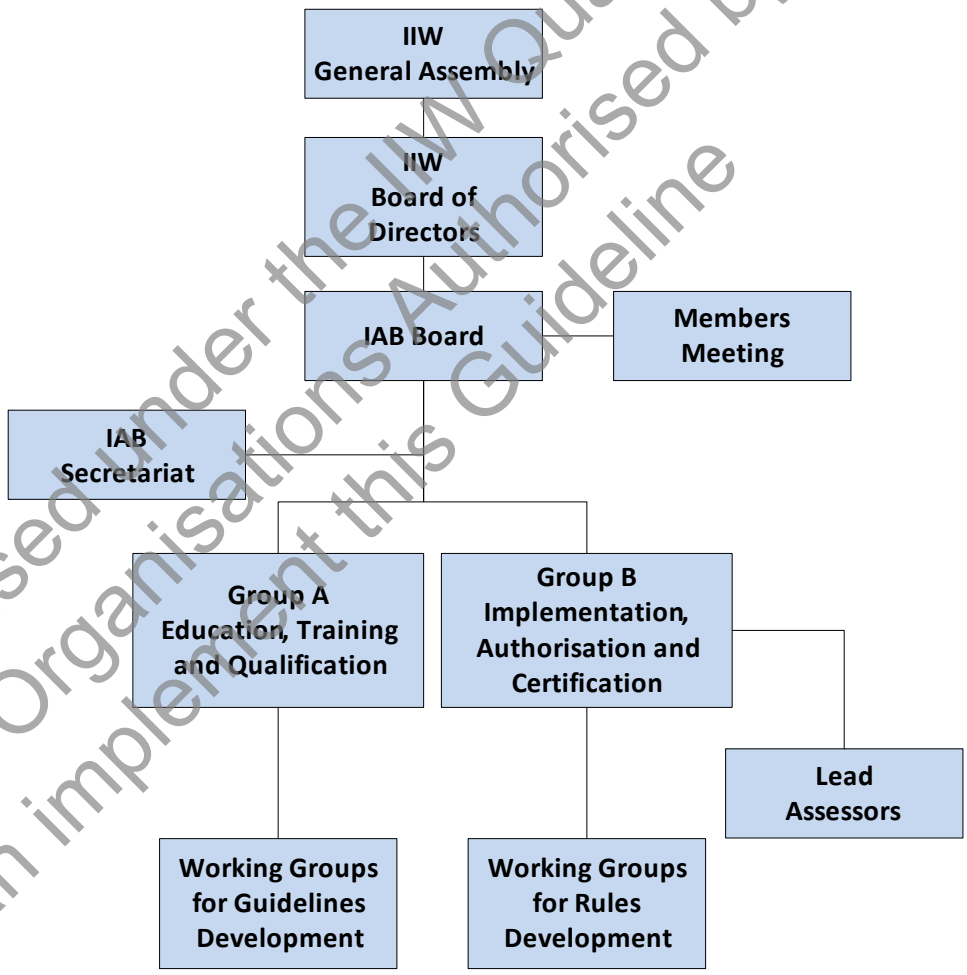


Figure 1: Organisation of IAB

Minimum requirements for the Theoretical Education, Practical Training and Examination of International Welders – Experienced Welders

The use of this Guideline is restricted to organizations approved by the Authorized Nominated Body as Approved Training Bodies (ATB). The requirements for gas welding and arc welding are described in this Guideline in general. Special requirements for welding processes and materials are described in modules.

The practical exercises mentioned in this Guideline applies to steels and aluminum and may be used as a basis for other materials.

Part III

1. Introduction

This Guideline as minimum requirements for the education and training of welders - Specifically for Experienced Welders has been prepared, evaluated, and formulated by Group A of the International Authorization Board (IAB) of the International Institute of Welding (IIW).

The Guideline seeks to achieve harmonisation in the training, examination, and qualification testing of welders – specifically for Experienced Welders in the world. It provides for the assessment of both theoretical knowledge and practical skills, the latter being linked to the requirements of ISO 9606 (or equivalent standard).

The ISO 9606- series of International Standards provides a scheme for qualification testing of welders, to evaluate their skill for limited ranges of welding conditions. It serves for quality assurance for a specific job but does not provide an education and training programme. However, the industry needs welders with more skill for the sake of flexibility in production and this Guideline provides a combination of comprehensive theoretical knowledge and high practical skills, assessed by tests of increasing difficulty, including ISO 9606 qualification tests and by theoretical examinations.

This Guideline takes care of both requirements and gives methods for practical training and theoretical education of fillet, plate and tube welders.

The education and training program consists of three theoretical modules “A”, “B” and “C”, which provide basic theoretical knowledge in welding, and six practical modules (three (3) pairs) corresponding to the three levels of skill. Special requirements for each welding process are given in modules S. Special requirements per material (group) are described in modules P.

For each level of skill, the practical examinations can be according to ISO 9606 or an equivalent standard.

It is for the ANB to decide whether it is desirable to add knowledge on specific materials to the course. Such knowledge should be in addition to the basic knowledge as specified in this Guideline.

The Guideline will be revised periodically by Group A of the IAB, for revision should there be any changes, which may affect the 'state of the art'.

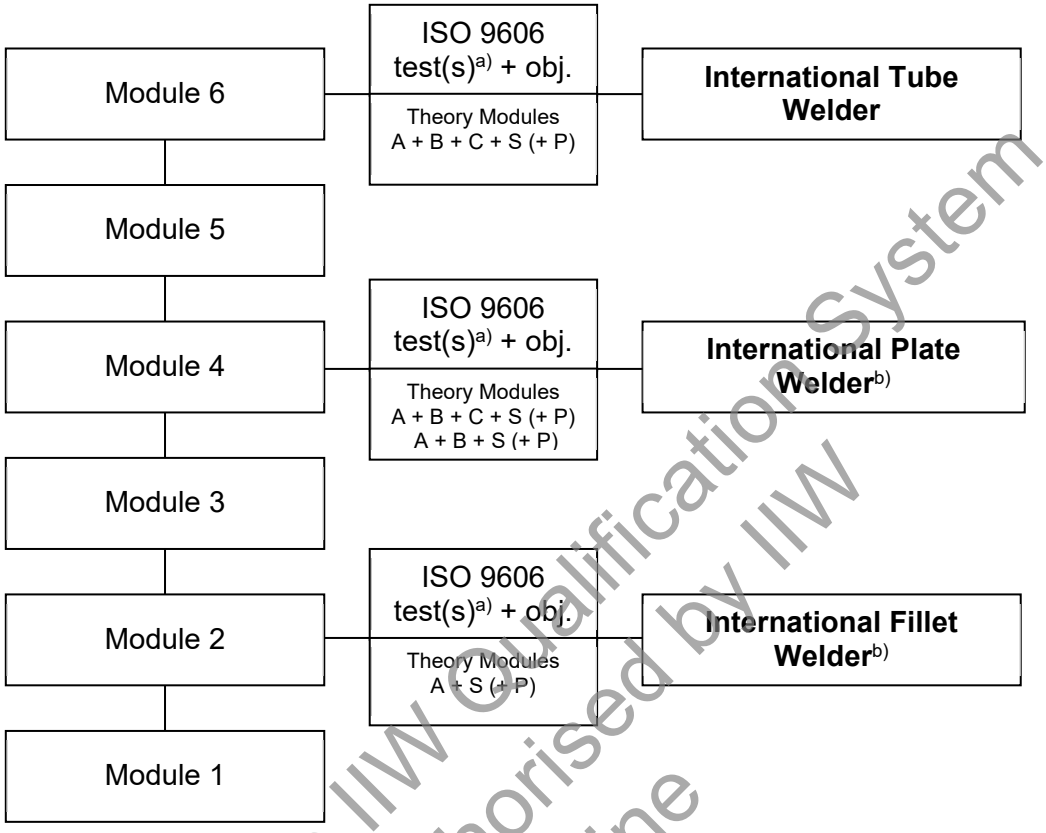


Figure 2: The over-all structure of the training and examination of the International welder.

Note [a)] - The modules 2, 4 and 6 **SHALL** be completed by comprehensive ISO 9606 tests or equivalent standards.

Note [b)] - At the option of the ATB and in agreement with the ANB, it may not be necessary to issue intermediate welders approvals and diplomas, if the student training program is designed to award an upper qualification level, e.g.: training program to award the Tube Diploma, the intermediate diplomas and welder approvals for Plate and Fillet may not be issued.

For Fillet Welder, Plate Welder and Tube Welder, two different diplomas are possible:

- **Comprehensive Diploma**, when the student performs all exams (practical and theoretical) defined in Part I for the diploma sought and for the lower diploma's levels (see 4.1.A for details).
- **Standard Diploma,** when the student only performs some of the exams, as defined in 4.1 B and 4.2.

2. Access to the course

Applicants must possess sufficient knowledge of, or education in, metalworking to follow the course. They must also have a level of health, and physical and mental capability, to undergo the training for which they are applying.

The Access conditions for Experienced route (single or double process) shall be:

- Must have a valid welder approval.

And

- Professional experience as welder – Two (2) years in the last Three (3) years that shall be confirmed by:

  - Using valid or expired welder's approvals, that will show he/she has been a welder for at least two years.

  and/or

  - CV plus Employer letters endorsing he/she has been a welder for at least two years, more than one letter is accepted.

  And

  - Shall perform a regular welder approval test piece selected from the list given in Appendix 1, at the level the applicant states on his/her CV, the evaluation by visual inspection, and the way he/she has performed the exam, see the exam scoring matrix/script in Appendix 2.

On the application the candidate shall clearly define the level sought for his/her experienced route qualification:

- Fillet or Plate or Tube.
- Single process or double process.
- Identify welding process or processes.
- Base material(s).

On the application the applicant shall state clearly what level of experience the welder has in terms of welding processes, materials, type of joint (FW or BW) and type of product (plate or tube).

The ATB is responsible for reviewing the candidate application and decide what will be the training path and examinations needed for the candidate to achieve the qualification sought.

3. Training Program Structure

3.1 Applicants applying for single welding process

The ATB will define the qualification level that is sought by the candidate based on the application, it shall be at the discretion of the ATB to request the candidate that he/she performs a specific practical test to evaluate his/her level of skills, see on Appendix 1 the list of practical tests that can be used.

After the ATB defined the qualification level sought, and the starting point of the candidate in terms of skills and knowledge, the candidate shall follow the training program defined by the ATB (the training program defined on Part I of this guideline can be followed if so decided) and the theoretical and practical examinations defined on Part I of this guideline.

Candidates when entering the training program based on their application and demonstration of skills, can be exempt of the practical exams (as defined on Part I) on the modules of the lower diploma levels (for example: an applicant sought to achieve the tube diploma level, he/she can be exempt to perform the practical exams of modules 1 to 4, as stated on Part I, but shall do the practical exams of modules 5 and 6). In this case the diploma that will be issued it will be always the **Standard Level**.

3.2 Applicants applying for double welding process

The ATB will define the qualification level that is sought by the candidate based on the application, it is at the discretion of the ATB to request the candidate that he/she performs a specific practical test to evaluate his/her level of skills, see item 3.1 regarding the type of tests.

If the candidate is applying for an International/European Welder Diploma for double process, the training program shall be defined based on:

- Based on modules defined on the Part I of this guideline with the aim to deliver to the candidate the necessary skills for each process at the level sought.

And

- Based on the specific modules for double processes that are referred ahead.

4. Awarding the IW Diploma

4.1 Diploma for single welding process

The student has two options in terms of the diploma to be granted:

A) If the diploma to be granted it is at the **Comprehensive Level**, the student shall perform all exams (practical and theoretical) as defined on Part I, such as:

- Fillet Welder Diploma – Exams A, SX, Z.1 and Z.2
- Plate Welder Diploma – Exams A, B, SX, Z.2. Z.3 and Z.4
- Tube Welder Diploma – Exams A, B, C, SX, Z.2, Z.4, Z.5 and Z.6

Note:
- SX means: SA or ST, or SM or SG
- Z.2 means: E.2 or T.2 or M.2, the same applies for Z.3, Z.4, Z.5 and Z.6

B) If the diploma to be granted is a **Standard Diploma**, the student shall perform all the theoretical exams as defined in Part I but only the specific practical exams for the diploma he/she selected, such as (the exams code is referred to Part I):

- Training was focused to develop skills for BW on tube, position H-L045 – Exams A, B, C, SX, and Z.5, and Z.6
- Training was focused to develop skills for BW on plate, position PF – Exams A, B, SX, Z.3 and Z.4 (only PF exam see Part I)
- Training focused to develop skills for FW on plate/tube, position PH – Exams A, SX Z.1 and Z.2 (only PH exam see Part I)

Note: See the note on the item A) above
These candidates shall perform the practical and theoretical exams as stated on Part I.

If the candidate is successful in the theoretical and practical examinations, the IW Diploma shall be awarded.

To award the diploma either for a diploma at **Comprehensive** or **Standard** Level, a welder approval shall always be issued according to ISO 9606 or equivalent standard, at the level of the last practical exam.

4.2 Diploma for double welding processes

Candidates who want a diploma using two welding processes on one test shall only be issued at **Standard Level**:

- The student must perform all theoretical exams as defined on Part I at the level wanted (Plate **or** Tube, including the specific theoretical part for both processes).
- The student must perform the practical exams that are defined on this Part III, section 7

If the candidate is successful in the theoretical and practical examinations, the IW Diploma shall be awarded.

To award the **Standard** diploma, a welder approval shall be always issued according to ISO 9606 or equivalent standard, at the level of the last practical exam.

5. Theoretical education

Any candidate can only be awarded the International welder Diploma if he/she has successfully completed the theoretical exams defined in Part I of this Guideline, the theoretical modules are:

5.1 General knowledge

Module A
Module B
Module C

5.2 Process Knowledge

Module SA
Module ST
Module SM
Module SG

5.3 Materials Knowledge

Module PSS
Module PAL

Note: Candidate for a double process diploma, shall perform and approve the theoretical exams of both processes.

6. Practical Training

6.1 General

This Guideline applies mainly to ferritic steels (group 1, 2, 3 and 11 according to ISO/TR 15608) and – where applicable – stainless steels (group 8 and 10 according to ISO/TR 15608) and may be used as a basis for other materials until a corresponding Guideline exists. The application of this program to other materials than given with the exercises may require slight changes to the work pieces and / or the positions to be welded. Such changes require principal approval of the ANB.

6.2 Welding Simulating Systems

There are many intelligent computer aided welding simulating systems available. If an existing welding simulation system is suitable to be used in welding training sessions for a special process, they shall be approved by the ANB. In the case of an approved simulation system, the ATB can decide if they will use it.

The recommended training hours depend on each system can be different from one to another system. The decision about the range of using is up to the ATB, and the ANB shall approve it.

6.3 All modules

In all training modules the following Learning Outcomes apply:

1. Assemble and tacking the work piece.
2. Take the necessary precautions to avoid distortion prior to, during and after welding.
3. Follow the welding symbols and the (p)WPS (related to the proposed weld).
4. Perform safe welding according to the (p)WPS (or welding instruction).
5. Select the appropriate type of consumable and the desired size according to the (p)WPS (or welding instruction).

7. Specific Training and Tests for Double Processes Diplomas

7.1 Objectives and scopes of double process applications (Plate)

7.1.1 Double Process TIG – root (Plate)

Objective:

To obtain basic experience in combining 141 (TIG welding with filler material) for root pass and MMA (111), MAG (135), FCW (136) or FCW (138) welding for fill and Cap, and produce butt welds in plate in PA, PC, PE, PF and PG positions.

Scope:

See tables DPT(SX)

DP – Double Process
T – Welding process (TIG)
SX – Second welding process, e.g.: SE (for 111) or SM (for 135, 136 or 138)

The average recommended time for the exercises is about 90 h.

Learning Outcomes:

The student is capable to (in addition to 8.3):

1. Adjust the welding power source to fit the purpose.
2. Control the welding power source efficiently.
3. Make sound fillet welds in different types of joints as specified in tables DPT (SX)1 and DPT(SX)2 in single and multi-run techniques.
4. Perform flame and / or plasma cutting in the range of 3 – 15 mm (not tested).
5. Perform grinding, and/or gouging (not tested).
6. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control.

7.1.2 Double Process MMA root (Plate)

Objective:

To obtain experience in combining 111 (MMA) for root pass and MMA (111), MAG (135), FCW (136) and FCW (138) welding process for fill and cap for butt welds in PA, PC, PF, PE and PG positions.

Note [1)] - The filler and Cap consumable is different than the root pass

Scope:
See tables DPE(SX)

DP – Double Process
E – Welding process (MMA)
SX – Second welding process, e.g.: SE (for 111) or SM (for 135, 136 or 138)
The average recommended time for the exercises is about 90 h.

Learning Outcomes:
The student is capable to (in addition to 8.3):

1. Adjust the welding power source to fit the purpose.
2. Control the welding power source efficiently.
3. Make sound fillet welds in different types of joints as specified in table DPE (SX).1 and DPE(SX)2 in single and multi run technique.
4. Perform flame and / or plasma cutting in the range of 3 – 15 mm (not tested).
5. Perform grinding, and/or gouging (not tested).
6. Visually inspect his/her own work and take appropriate action resulting from that I nspection and deal with problems within his/her control.

7.1.3 Double Process MAG root (Plate)

Objective:
To obtain basic experience in combining the MAG welding process (135, 136 and 138) as root pass and MMA (111), MAG (135), FCW (136) and FCW (138) welding process for fill and Cap to be able to produce butt welds in plate in PA, PC, PE, PF and PG positions.

Scope:
See tables DPM(SX)

DP - Double Process
M - Welding process (MAG)
SX - Second welding process, e.g.: SE (for 111) or SM (for 135, 136 or 138)
The average recommended time for the exercises is about 75 h.

Learning Outcomes:
The student is capable to (in addition to 8.3):

1. Adjust the welding power source to fit the purpose.
2. Control the welding power source efficiently.
3. Make sound fillet welds in different types of joints as specified in tables DPM (SX)1 and DPM(SX)2 M 3 in single and multi-run technique.
4. Perform flame and / or plasma cutting in the range of 3 – 15 mm (not tested).
5. Perform grinding, and/or gouging (not tested).
6. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal

7.2 Objectives and scopes of double process applications (Tube)

7.2.1 Double Process TIG – root (Tube)

Objective:
To obtain basic experience in combining 141 (TIG welding with filler material) for root pass and MMA (111), MAG (135), FCW (136) or FCW (138) welding for fill and Cap, and produce butt welds in tube in PA, PB, PC, PD, PE, PF, PG, PH and H-L045 positions.

Scope:

See tables DPT(SX)

DP – Double Process
T – Welding process (TIG)
SX - Second welding process, e.g.: SE (for 111) or SM (for 135, 136 or 138)

The average recommended time for the exercises is about 90 h.

Learning Outcomes:

The student is capable to (in addition to 8.3):

1. Adjust the welding power source to fit the purpose.
2. Control the welding power source efficiently.
3. Make sound fillet welds in different types of joints as specified in tables DPT (SX)1 and DPT (SX)2 in single and multi-run techniques.
4. Perform flame and / or plasma cutting in the range of 3 – 15 mm (not tested).
5. Perform grinding, and/or gouging (not tested).
6. Visually inspect his/her own work and take appropriate action resulting from that inspection and deal with problems within his/her control.

7.2.2 Double Process MMA root (Tube)

Objective:

To obtain experience in combining 111 (MMA) for root pass and MMA (111)[1)], MAG (135), FCW (136) and FCW (138) welding processes for fill and cap for butt welds in PA, PC, PE, PH and H-L045 positions.

Note [1)] -The filler and Cap consumable is different than the root pass

Scope:

See tables DPE(SX)

DP – Double Process
E - Welding process (MMA)
SX - Second welding process, e.g.: SE (for 111) or SM (for 135, 136 or 138)

The average recommended time for the exercises is about 90 h.

Learning Outcomes:

The student is capable to (in addition to 8.3):

1. Adjust the welding power source to fit the purpose.
2. Control the welding power source efficiently.
3. Make sound single sided welds in different types of joints as specified in tables DPE(SX1) and DPE(SX2) in single and multi run technique.
4. Perform flame and / or plasma cutting in the range of 3 – 15 mm (not tested).
5. Perform grinding, and/or gouging (not tested).
6. Visually inspect his/her own work and take appropriate action resulting from that I nspection and deal with problems within his/her control.

7.2.3 Double Process MAG root (Tube)

Objective:

To obtain basic experience in combining the MAG welding process (135, 136 and 138) as root pass and MMA (111), MAG (135)[1)], FCW (136)[1)] and FCW (138)[1)] welding process for fill and Cap to be able to produce butt welds in plate in PA, PC, PB, PD, PF, PG and PH positions.

Note [1)] - The filler and Cap consumable is different than the root pass

Scope:
See tables DPM(SX)

DP - Double Process
M - Welding process (MAG)
SX - Second welding process, e.g.: SE (for 111) or SM (for 135, 136 or 138)
The average recommended time for the exercises is about 90 h.

Learning Outcomes:
The student is capable to (in addition to 8.3):

1. Adjust the welding power source to fit the purpose.
2. Control the welding power source efficiently.
3. Make sound single sided welds in different types of joints as specified in tables DPM(SX1),DPM(SX2) and DPM(SX3) in single and multi run technique.
4. Perform flame and / or plasma cutting in the range of 3 – 15 mm (not tested).
5. Perform grinding, and/or gouging (not tested).
6. Visually inspect his/her own work and take appropriate action resulting from that I nspection and deal with problems within his/her control.

7.3 Possible combinations of double processes

During the qualification process using double (dual) welding processes for the practical exercises, the following possible combinations for the root and fill & cap can be used. Please also refer to Table 1.

1) MMA[1)] (111) root / MMA[1)] (111), MAG (135), FCW (136, 138) Fill and Cap
2) TIG (141) root / MMA (111), MAG (135), FCW (136,138) Fill and Cap
3) MAG (135) root / MMA (111), FCW (136, 138) Fill and Cap
4) FCW (136) root / MMA (111), MAG (135,138) Fill and Cap
5) FCW (138) root / MMA, MAG, FCW (136) Fill and Cap

Note [1)] – Where the process is the same but the welding material for the root and filler and capping material will be different

General definition of "Root", and/or "Hot Pass" and "Filler and Cap":

Root: Can be defined as a single or multiple electrode pass(es) situated in the root of the welding joint.
Hot Pass: A second electrode pass on top of the initial/first pass welded in the root of the welding joint acting as post weld heat treatment of the initial root pass.
Filler and Cap: The subsequent electrode runs to complete and "fill up" of the weld joint configuration.

Welding Process for Root (ss nb)	Welding Process for Fill & Cap (bs or ss mb)			
	111	135	136	138
111 (B[2], C [3])	P, T	P, T	P, T	P, T
141	P, T	P, T	P, T	P, T
135	P, T	-	P, T	P, T
136	P, T	P, T	-	P, T
138	P, T	P, T	P, T	-

Table 1: Practical welding combinations for different processes for the root and fill & cap for butt welds on plate and tube.

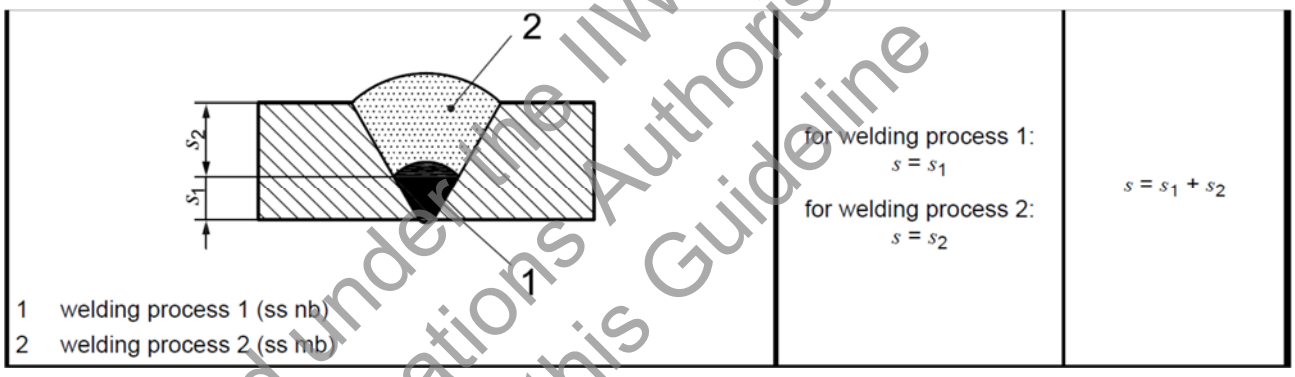
Key:

P: Plate Note [2] - B: Basic Electrode

T: Tube Note [3] - C: Cellulosic Electrode

Typical joint configuration for Butt weld qualification using dual welding processes:

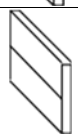
- Process 1 (S_1) – root (r)
- Process 2 (S_2) – fill (f) and cap (c)
- $S = S_1+S_2$ – Total deposit thickness of process 1 (S_1) and process 2 (S_2)



7.4 Double Process – Plate and Tube

7.4.1 Double Process TIG root

7.4.1.1 Double Process TIG root – plate: PA, PC

DPT(SX).1	Practical training (TIG Root)			Material group 1, 2, 3, 8, 10, 11 (ISO/TR 15608)	
No.					Process 141 + (SX)
	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Process(es)
1	Butt weld in plate	t > 8	PA, PC		141 and 111 or 135 or 136 or 138
2	Butt weld	t > 8	PA		141 – Root – ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
3	Butt weld	t > 8	PA		141 – Root – ss nb 135 – Fill & Cap - ss mb
4	Butt weld	t > 8	PA		141 – Root – ss nb 136 or 138 – Fill & Cap - ss mb
5	Butt weld	t > 8	PC		141 – Root – ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
6	Butt weld	t > 10	PC		141 – Root - ss nb 135 – Fill & Cap - ss mb
7	Butt weld	t > 10	PC		141 – Root - ss nb 136 or 138 – Fill & Cap - ss mb

Note [3] - C – Cellulosic electrode
Note [2] - B – Basic electrode, to be used only one type of covering

The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 141 + 111, the mandatory exercises are: 1, 2 and 4

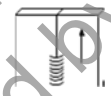
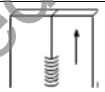
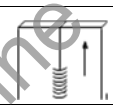
DPT(SX).1 - Welding and evaluation of test pieces according to the appropriate part of ISO 9606 and combination of dual processes; only visual testing required.

No.	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Processes/Remarks*
1	Butt weld	t > 8	PA		141 – Root – ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
2	Butt weld	t > 8	PA		141 – Root – ss nb 135 – Fill & Cap – ss mb
3	Butt weld	t > 8	PA		141 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
4	Butt weld	t > 8	PC		141 – Root – ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
5	Butt weld	t > 10	PC		141 – Root – ss nb 135 – Fill & Cap – ss mb
6	Butt weld	t > 10	PC		141 – Root – ss nb 136 or 138 – Fill & Cap – ss mb

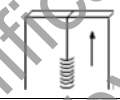
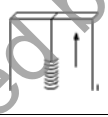
Note $^{3)}$ - C – Cellulosic electrode
Note $^{2)}$ – B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 141 + 111, the mandatory test pieces are: 1 and 4. The tests can be witness and evaluated by the Practical Instructor

7.4.1.2 Double Process TIG root – plate: PE, PF

DPT(SX).2	Practical training (TIG Root)		Material group 1, 2, 3, 8, 10, 11 (ISO/TR 15608)		
No.					Process 141 + (SX)
	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Process(es)/Remarks
1	Butt weld in plate	t > 8	PE, PF		141 and 111 or 135 or 136 or 138
2	Butt weld	t > 8	PE		141 – Root – ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
3	Butt weld	t > 8	PE		141 – Root – ss nb 135 – Fill & Cap - ss mb
4	Butt weld	t > 8	PE		141 – Root – ss nb 136 or 138 – Fill & Cap - ss mb
5	Butt weld	t > 8	PF		141 – Root – ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
6	Butt weld	t > 10	PF		141 – Root – ss nb 135 – Fill & Cap – ss mb
7	Butt weld	t > 10	PF		141 – Root – ss nb 136 or 138 – Fill & Cap - ss mb
Note [3] - C – Cellulosic electrode Note [2] - B – Basic electrode, to be used only one type of covering					
The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 141 + 111, the mandatory exercises are: 1, 2 and 4					

DPT(SX).2 - Welding and evaluation of test pieces according to the appropriate part of ISO 9606 and combination of dual processes; The test pieces shall be evaluated according to the ISO 9606-1 examination requirements and at least one welder approval certificate shall be issued, e.g.: The one who has a larger range of approval for the welding position

No.	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Processes
1	Butt weld	t > 8	PE		141 – Root 111 – Fill & Cap (C[3], B[2])
2	Butt weld	t > 10	PE		141 – Root 135 – Fill & Cap
3	Butt weld	t > 10	PE		141 – Root – ss nb 136 or 138 – Fill & Cap – s mb
4	Butt weld	t > 8	PF		141 – Root – ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
5	Butt weld	t > 10	PF		141 – Root – ss nb 135 – Fill & Cap – ss mb
6	Butt weld	t > 10	PF		141 – Root – ss nb 136 or 138 – Fill & Cap – ss mb

Note [3] - C – Cellulosic electrode
Note [2] - B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 141 + 111, the mandatory test pieces are: 1 and 4. The tests shall be witness by the Authorised Examiner

7.4.2 Double Process MMA root

7.4.2.1 Double Process MMA root – plate: PA, PC

DPE(SX).1	Practical training (MMA Root)			Material group 1, 2, 3, 8, 10, 11 (ISO/TR 15608)	
No.					Process 111 + (SX)
	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Process(es)
1	Butt weld in plate	t > 8	PA, PC		111 and 135 or 136 or 138
2	Butt weld	t > 8	PA		111 – Root (C[3], B[2]) - ss nb 111 – Fill & Cap (C[3] or B[2] - ss mb
3	Butt weld	t > 10	PA		111 – Root (B[2], C[3]) - ss nb 135 – Fill & Cap - ss mb
4	Butt weld	t > 10	PA		111 – Root (B[2], C[3]) ** - ss nb 136 or 138 – Fill & Cap - ss mb
5	Butt weld	t > 8	PC		111 – Root (C[3], B[2]) - ss nb 111 – Fill & Cap (C[3] or B[2] the covering shall be different from the root covering) – ss mb
6	Butt weld	t > 10	PC		111 – Root (C[3], B[2]) - ss nb 135 – Fill & Cap - ss mb
7	Butt weld	t > 10	PC		111 – Root (C[3], B[2]) - ss nb 136 or 138 – Fill & Cap - ss mb
Note [3] - C – Cellulosic electrode Note [2] - B – Basic electrode, to be used only one type of covering					
The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 111 + 135, the mandatory exercises are: 1, 3 and 5.					

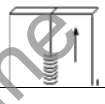
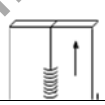
DPE(SX).1: Welding and evaluation of test pieces according to the appropriate part of ISO 9606 and combination of dual processes; only visual testing required.

No.	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Processes/Remarks
1	Butt weld	t □ 8	PA		ss-mb 111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) – ss mb
2	Butt weld	t > 10	PA		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 135 – Fill & Cap – ss mb
3	Butt weld	t > 10	PA		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 136 or 138 – Fill & Cap – ss mb
4	Butt weld	t > 8	PC		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) – ss mb
5	Butt weld	t > 10	PC		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 135 – Fill & Cap – ss mb
6	Butt weld	t > 10	PC		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 136 or138 – Fill & Cap – ss mb

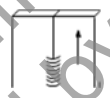
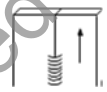
Note $^{3)}$ - C – Cellulosic electrode
Note $^{2)}$ – B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 111 + 135, the mandatory test pieces are: 2 and 5. The tests can be witness and evaluated by the Practical Instructor

7.4.2.2 Double Process MMA root – Plate: PE, PF

DPE(SX).2	Practical training (MMA Root)		Material group 1, 2, 3, 8, 10, 11 (ISO/TR 15608)		
No.					Process 111 + (SX)
	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Process(es)
1	Butt weld in plate	t > 8	PE, PF		111 and 135 or 136 or 138
2	Butt weld	t > 8	PE		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) - ss mb
3	Butt weld	t > 10	PE		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 135 – Fill & Cap ss mb
4	Butt weld	t > 10	PE		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 136 or 138 – Fill & Cap - ss mb
5	Butt weld	t > 8	PF		111 – Root ($C^{3)}$, $B^{2)}$) ** - ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) - ss mb
6	Butt weld	t > 10	PF		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb MAG – Fill & Cap - ss mb
7	Butt weld	t > 10	PF		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 136 or 138 - Fill & Cap - ss mb
Note $^{3)}$ - C – Cellulosic electrode Note $^{2)}$ – B – Basic electrode, to be used only one type of covering					
The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 111 + 135, the mandatory exercises are: 1, 3 and 5					

DPE(SX).2: Welding and evaluation of test pieces according to the appropriate part of ISO 9606 and combination of dual processes; The test pieces shall be evaluated according to the ISO 9606-1 examination requirements and at least one welder approval certificate shall be issued, e.g.: the one who has a larger range of approval for the welding position

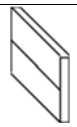
No.	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Processes
1	Butt weld	t > 8	PE		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering)- ss mb
2	Butt weld	t > 10	PE		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 135 – Fill & Cap – ss mb
3	Butt weld	t > 10	PE		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 136 or 138 – Fill & Cap – ss mb
4	Butt weld	t > 8	PF		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) - ss mb
5	Butt weld	t > 10	PF		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 135 – Fill & Cap – ss mb
6	Butt weld	t > 10	PF		111 – Root ($C^{3)}$, $B^{2)}$) - ss nb 136 or 138 – Fill & Cap – ss mb

Note [3)] - C – Cellulosic electrode
Note [2)] - B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 111 + 135, the mandatory test pieces are: 2 and 5. The tests shall be witness by the Authorised Examiner

7.4.3 Double Process MAG root

7.4.3.1 Double Process MAG root – plate: PA, PC

DPM(SX).1	Practical training (MAG Root)			Material group 1, 2, 3, 8, 10, 11 (ISO/TR 15608)	
No.					Process MAG + (SX)
	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Process(es)/Remarks
1	Butt weld in plate	t > 8	PA, PC		111 and 135 or 136 or 138
2	Butt weld	t > 10	PA		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
3	Butt weld	t > 10	PA		FCW 136 or 138 – Root – ss nb 135 – Fill & Cap - ss mb
4	Butt weld	t > 10	PA		135 – Root – ss nb FCW 136 or 138 – Fill & Cap - ss mb
5	Butt weld	t > 10	PC		135 or 16 or 138 – Root - ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
6	Butt weld	t > 10	PC		FCW 136 or 138 – Root – ss nb 135 – Fill & Cap - ss mb
7	Butt weld	t > 10	PC		135 – Root – ss nb FCW 136 or 138 – Fill & Cap - ss mb

Note [3] - C – Cellulosic electrode
Note [2] - B – Basic electrode, to be used only one type of covering

The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 135 + 111, the mandatory test pieces are: 1, 2 and 5

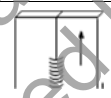
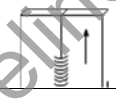
DPM(SX).1: Welding and evaluation of test pieces according to the appropriate part of ISO 9606 and combination of dual processes; only visual testing required.

No.	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Remarks
1	Butt weld	t > 10	PA		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
2	Butt weld	t > 10	PA		FCW 136 or 138 - Root – ss nb 135 – Fill & Cap – ss mb
3	Butt weld	t > 10	PA		135 – Root – ss nb FCW 136 or 138 – Fill & Cap – ss mb
4	Butt weld	t > 10	PC		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
5	Butt weld	t > 10	PC		135 – Root – ss nb FCW 136 or 138 – Fill & Cap – ss mb
6	Butt weld	t > 10	PC		136 or 138 – Root – ss nb 135 – Fill & Cap - ss mb

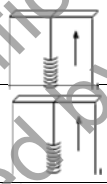
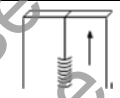
Note 3) - C – Cellulosic electrode
Note 2) - B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 135 + 111, the mandatory test pieces are: 1 and 4. The tests can be witness and evaluated by the Practical Instructor

7.4.3.2 Double Process MAG root – plate: PE, PF

DPM(SX).2	Practical training (MAG Root) 15608)			Material group 1, 2, 3, 8, 10, 11 (ISO/TR	
No.					Process MAG + (SX)
	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Process(es)
1	Butt weld in plate	t > 10	PE, PF		111 and 135 or 136 or 138
2	Butt weld	t > 10	PE		135 or 136 or 138 – Root- ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
3	Butt weld	t > 10	PE		FCW 136 or 138 - Root – ss nb 135 – Fill & Cap – ss mb
4	Butt weld	t > 10	PE		135 – Root – ss nb FCW 136 or 138 – Fill & Cap – ss mb
5	Butt weld	t > 10	PF		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
6	Butt weld	t > 10	PF		135 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
7	Butt weld	t > 10	PF		136 or 138 – Root – ss nb 135 – Fill & Cap – ss mb
Note $^{3)}$ - C – Cellulosic electrode Note $^{2)}$ – B – Basic electrode, to be used only one type of covering					
The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 135 + 111, the mandatory test pieces are: 1, 2 and 4					

DPM(SX).2: Welding and evaluation of test pieces according to the appropriate part of ISO 9606 and combination of dual processes; The test pieces shall be evaluated according to the ISO 9606-1 examination requirements and at least one welder approval certificate shall be issued, e.g.: The one who has a larger range of approval for the welding position

No.	Type of weld	Recommended material thickness [mm]	Welding position	Sketch	Processes
1	Butt weld	t > 10	PE		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) ss mb
2	Butt weld	t > 10	PE		136 or 138 – Root - ss nb 135 – Fill & Cap – ss mb
3	Butt weld	t > 10	PE		135 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
4	Butt weld	t > 10	PF		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
5	Butt weld	t > 10	PF		135 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
6	Butt weld	t > 10	PF		136 or 138 – Root – ss nb 135 – Fill & Cap – ss mb

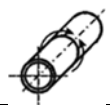
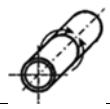
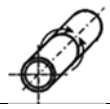
Note $^{3)}$ - C – Cellulosic electrode
Note $^{2)}$ – B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 135 + 111, the mandatory test pieces are: 1 and 4. The tests shall be witness by the Authorised Examiner

7.5 Double Process – Tube

7.5.1 Double process TIG root

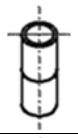
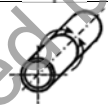
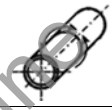
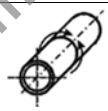
7.5.1.1 Double Process TIG root – tube: PH, PC, H-L045

DPT(SX).3	Practical training (Tube TIG root) 15608)			Material group 1, 2, 3, 8, 10, 11 (ISO/TR	
No.				Process 141 + SX	
	Type of weld	Recommended material thickness / diameter [mm]	Welding position	Sketch	Remarks
1	Butt weld	t > 8 40 ≤ D ≤ 100	PC		141 – Root – ss nb 111 – Fill & Cap (C[3]), B[2]) - ss mb
2	Butt weld	t > 8 D ≥ 100	PC		141 – Root – ss nb 135 – Fill & Cap - ss mb
3	Butt weld	t > 8 D ≥ 100	PC		141 – Root – ss nb 136 or 138 – Fill & Cap - ss mb
4	Butt weld	t > 8 40 ≤ D ≤ 100	PH*		141 – Root – ss nb 111 – Fill & Cap (C[3]), B[2]) - ss mb
5	Butt weld	t > 8 D ≥ 100	PH[4)]		141 – Root – ss nb 135 – Fill & Cap - ss mb
6	Butt weld	t > 8 D ≥ 100	PH[4)]		141 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
7	Butt weld	t > 8 40 ≤ D ≤ 100	H-L045		141 – Root – ss nb 111 – Fill & Cap (C[3]), B[2]) - ss mb
8	Butt weld	t > 8 D ≥ 100	H-L045		141 – Root – ss nb 135 – Fill & Cap – ss mb
9	Butt weld	t > 8 D ≥ 100	H-L045		141 – Root – ss nb 136 or 138 – Fill & Cap – ss mb

Note [4)] -According to ISO 6947:2011 welding position PF for tubes has been changed to test position PH covering PE, PF and PA.
Note [3)] - C – Cellulosic electrode
Note [2)] – B – Basic electrode, to be used only one type of covering

The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 141 + 111, the mandatory test pieces are: 1, 4 and 7

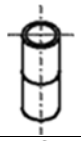
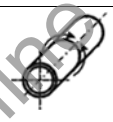
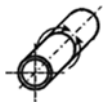
DPT(SX).3: Welding and evaluation of test pieces according to the appropriate part of ISO 9606; The test pieces shall be evaluated according to the ISO 9606-1 examination requirements and at least one welder approval certificate shall be issued, e.g.: The one who has a larger range of approval for the welding position

No.	Type of weld	Recommend edmaterial thickness / diameter [mm]	Welding position	Sketch	Remarks
1	Butt weld	t > 8 40 ≤ D ≤ 100	PC		141 – Root – ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
2	Butt weld	t > 8 D ≥ 100	PC		141 – Root – ss nb 135 - Fill & Cap - ss mb
3	Butt weld	t > 8 D ≥ 100	PC		141 – Root – ss nb 136 or 138 – Fill & Cap - ss mb
4	Butt weld	t > 8 40 ≤ D ≤ 100	PH[4)]		141 – Root – ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
5	Butt weld	t > 8 D ≥ 100	PH[4)]		141 – Root – ss nb 135 – Fill & Cap – ss mb
6	Butt weld	t > 8 D ≥ 100	PH[4)]		141 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
7	Butt weld	t > 5 40 ≤ D ≤ 100	H-L045		141 – Root – ss nb 111 – Fill & Cap ($C^{3)}$, $B^{2)}$) - ss mb
8	Butt weld	t > 5 D ≥ 100	H-L045		141 – Root – ss nb 135 – Fill & Cap- ss mb
9	Butt weld	t > 5 D ≥ 100	H-L045		141 – Root – ss nb 136 or 138 – Fill & Cap- ss mb

Note [4)] - According to ISO 6947:2011 welding position PF for tubes has been changed to test position PH covering PE, PF and PA.
Note [3)] - C – Cellulosic electrode
Note [2)] - B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 141 + 111, the mandatory test pieces are: 1, 4 and 7. The tests shall be witness by the Authorised Examiner

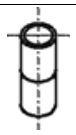
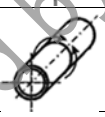
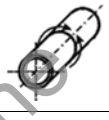
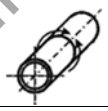
7.5.2 Double Process MMA root – tube: PC, PH, H-L045

DPE(SX).3	Practical training (Tube MMA root)		Material group 1, 2, 3, 8, 10, 11 (ISO/TR 15608)		
No.					Process MMA + SX
	Type of weld	Recommended material thickness / diameter [mm]	Welding position	Sketch	Remarks
1	Butt weld	t > 5 40 ≤ D ≤ 100	PC		111 – Root ($C^{3)}$, $B^{2)}$) ** – ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering)- ss mb
2	Butt weld	t > 8 D ≥ 100	PC		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 135 – Fill & Cap - ss mb
3	Butt weld	t > 8 D ≥ 100	PC		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 136 or 138 – Fill & Cap - ss mb
4	Butt weld	t > 8 40 ≤ D ≤ 100	PH[4)]		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) - ss mb
5	Butt weld	t > 8 D ≥ 100	PH[4)]		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 135 – Fill & Cap - ss mb
6	Butt weld	t > 8 D ≥ 100	PH[4)]		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 136 or 138 – Fill & Cap – ss mb
7	Butt weld	t > 5 40 ≤ D ≤ 100	H-L045		111 – Root ($C^{3)}$, $B^{2)}$) ** – ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) - ss mb
8	Butt weld	t > 8 D ≥ 100	H-L045		111 – Root ($C^{3)}$, $B^{2)}$) ** – ss nb 135 – Fill & Cap - ss mb
9	Butt weld	t > 8 D ≥ 100	H-L045		111 – Root (C, B) ** – ss nb 136 or 138 – Fill & Cap – ss mb

Note [4)] - According to ISO 6947:2011 welding position PF for tubes has been changed to test position PH covering PE, PF and PA.
Note [3)] - C – Cellulosic electrode
Note [2)] – B – Basic electrode, to be used only one type of covering

The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 111 + 135, the mandatory test pieces are: 2, 5 and 8

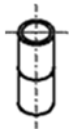
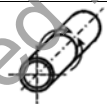
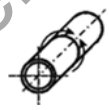
DPE(SX).3: Welding and evaluation of test pieces according to the appropriate part of ISO 9606; The test pieces shall be evaluated according to the ISO 9606-1 examination requirements and at least one welder approval certificate shall be issued, e.g.: The one who has a larger range of approval for the welding position

No.	Type of weld	Recommend edmaterial thickness / diameter [mm]	Welding position	Sketch	Remarks
1	Butt weld	t > 5 40 ≤ D ≤ 100	PC		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) - ss mb
2	Butt weld	t > 8 D ≥ 100	PC		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 135 – Fill & Cap - ss mb
3	Butt weld	t > 8 D ≥ 100	PC		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 136 or 138 – Fill & Cap - ss mb
4	Butt weld	t > 8 40 ≤ D ≤ 100	PH[4)]		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) - ss mb
5	Butt weld	t > 8 D ≥ 100	PH[4)]		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 135 – Fill & Cap - ss mb
6	Butt weld	t > 8 D ≥ 100	PH[4)]		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 136 or 138 – Fill & Cap – ss mb
7	Butt weld	t > 5 D ≤ D ≤ 100	H-L045		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 111 – Fill & Cap ($C^{3)}$ or $B^{2)}$ the covering shall be different from the root covering) – ss mb
8	Butt weld	t > 8 D ≥ 100	H-L045		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 135 – Fill & Cap - ss mb
9	Butt weld	t > 8 D ≥ 100	H-L045		111 – Root ($C^{3)}$, $B^{2)}$) – ss nb 136 or 138 – Fill & Cap - ss mb

Note [4)] - According to ISO 6947:2011 welding position PF for tubes has been changed to test position PH covering PE, PF and PA.
Note [3)] - C – Cellulosic electrode
Note [2)] - B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 111 + 135, the mandatory test pieces are: 2, 5 and 8. The tests shall be witness by the Authorised Examiner

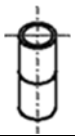
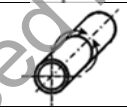
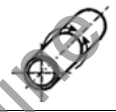
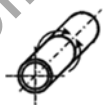
7.5.3 Double Process MAG root – tube: PC, PH, H-L045

DPM(SX).3	Practical training (Tube MAG root)			Material group 1, 2, 3, 8, 10, 11 (ISO/TR 15608)	
No.					Process MAG + SX
	Type of weld	Recommended material thickness / diameter [mm]	Welding position	Sketch	Process/Remarks
1	Butt weld	t > 8 D ≥ 100	PC		135 or 136 or 138 – Root – ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
2	Butt weld	t > 8 D ≥ 100	PC		135 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
3	Butt weld	t > 8 D ≥ 100	PC		136 or 138 – Root – ss nb 135 – Fill & Cap – ss mb
4	Butt weld	t > 8 D ≥ 100	PH[4]		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
5	Butt weld	t > 8 D ≥ 100	PH[4]		135 – Root - ss nb 136 or 138 – Fill & Cap- ss mb
6	Butt weld	t > 8 D ≥ 100	PH[4]		136 or 138 – Root – ss nb 135 – Fill & Cap – ss mb
7	Butt weld	t > 8 D ≥ 100	H-L045		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
8	Butt weld	t > 8 D ≥ 100	H-L045		135 – Root - ss nb 136 or 138 – Fill & Cap - ss mb
9	Butt weld	t > 8 D ≥ 100	H-L045		136 or 138 – Root - ss nb 135 – Fill & Cap - ss mb

Note [4] - According to ISO 6947:2011 welding position PF for tubes has been changed to test position PH covering PE, PF and PA.
Note [3] – C – Cellulosic electrode
Note [2] – B – Basic electrode, to be used only one type of covering

The mandatory practical exercises are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 135 + 111, the mandatory test pieces are: 1, 4 and 7

DPM(SX).3: Welding and evaluation of test pieces according to the appropriate part of ISO 9606; The test pieces shall be evaluated according to the ISO 9606-1 examination requirements and at least one welder approval certificate shall be issued, e.g.: The one who has a larger range of approval for the welding position

No.	Type of weld	Recommended material thickness / diameter [mm]	Welding position	Sketch	Process/Remarks
1	Butt weld	t > 8 D ≥ 100	PC		135 or 136 or 138 – Root – ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
2	Butt weld	t > 8 D ≥ 100	PC		135 – Root – ss nb 136 or 138 – Fill & Cap – ss mb
3	Butt weld	t > 8 D ≥ 100	PC		136 or 138 – Root – ss nb 135 – Fill & Cap – ss mb
4	Butt weld	t > 8 D ≥ 100	PH[4]		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
5	Butt weld	t > 8 D ≥ 100	PH[4]		135 – Root - ss nb136 or 138 – Fill & Cap- ss mb
6	Butt weld	t > 8 D ≥ 100	PH[4]		136 or 138 – Root - ss nb 135 – Fill & Cap - ss mb
7	Butt weld	t > 8 D ≥ 100	H-L045		135 or 136 or 138 – Root - ss nb 111 – Fill & Cap (C[3], B[2]) - ss mb
8	Butt weld	t > 8 D ≥ 100	H-L045		135 – Root - ss nb 136 or 138 – Fill & Cap - ss mb
9	Butt weld	t > 8 D ≥ 100	H-L045		136 or 138 – Root - ss nb 135 – Fill & Cap - ss mb

Note [4] - According to ISO 6947:2011 welding position PF for tubes has been changed to test position PH covering PE, PF and PA.
Note [3] - C – Cellulosic electrode
Note [2] - B – Basic electrode, to be used only one type of covering

The mandatory tests pieces are the ones above mentioned that are related with the double processes the students want to gain the diploma, e.g.: Student wants 135 + 111, the mandatory test pieces are: 1, 4, and 7, the test shall be witness by the Authorised Examiner

8. International/European welder specific requirements

See IAB 089r14 – Part I Section 15

Appendix 1:

List of Test Pieces to be used on access conditions evaluation

Gas Welding - steel:
For Tube Diploma:
311 T BW 1.1 or 5 S t ≥ 4,0 D ≥ 50 PC ss nb rw
311 T BW 1.1 or 5 S t ≥ 4,0 D ≥ 50 PH ss nb rw
311 T FW 1.1 or 5 S t ≥ 4,0 D ≥ 50 PH sl rw

Manual Metal Arc (MMA)welding - steel:
For Tube Diploma:
111 T BW 1.1 or 8 RB or B t 5,0 D ≥ 100 PC ssnb, and 111 T BW 1.1 or 8 RB or B t 5,0 D ≥ 100 PH ssnb
For Plate Diploma:
111 P BW 1.1 B t 5,0 PF ssnb and/or 111 P BW 1.1 B t 5,0 PD ssnb

Tungsten Inert Gas (TIG) welding - steel
For Tube Diploma:
141 T BW 1.1 or 8 S t ≥ 4,0 D ≥ 50 PC ssnb and 141 T BW 1.1 or 8 S t ≥ 4,0 D ≥ 50 PH ssnb
For Plate Diploma:
141 P BW 1.1 or 8 S t 5,0 PF ssnb and/or 141 P BW 1.1 or 8 S t 5,0 PD ssnb

Tungsten Inert Gas (TIG) welding - non-ferrous metals:
For Tube Diploma:
141 T BW 21 or 23 S t ≥ 4,0 D ≥ 50 PH ss nb
For Plate Diploma:
141 P BW 21 or 23 S t 2,0 PF ssnb and/or 141 P BW 31 wm t ≥ 3,0 PA ssnb

Gas-shielded metal arc (MAG) welding - steel:
For Tube Diploma:
135 T BW 1.1 or 8 S t ≥ 5,0 D ≥ 100 PC ssnb and 135 T BW 1.1 or 8 S t 5,0 D ≥ 100 PH ssnb
For Plate Diploma:
135 P BW 1.1 or 8 S t ≥ 5,0 PF ssnb and/or 135 P BW 1.1 or 8 S t 5,0 PD ssnb
Or
135/136 P BW 1.1 S/P t ≥ 10,0 PF ssnb/ssmb

Gas-shielded metal arc (MAG) welding - non-ferrous metals:
For Plate Diploma:
131 P BW 21 or 23 S t ≥ 4,0 PA ss nb
For Fillet Diploma:
131 P FW 21 or 23 S t ≥ 10,0 PF ml

Appendix 2:

Access conditions for Experience Welder route

Matrix/Script for the evaluation of candidates performing a welder's test pieces

Is the candidate must be able to:

Documentation review	**Points**
- Drawing reading:	
o read and give the signification / meaning of the symbolic representation of the welds	1/0
o pick-up the right WPS for the right weld to perform	1/0
- WPS reading: read and give the signification / meaning of	
o the reference number of the welding process	1/0
o the standard designation of the parent material	1/0
o the welding position	1/0
o the standard designation of the filler material	1/0
o the standard designation of the shielding gas (if applicable)	1/0
o the welding current type and polarity	1/0
Total (5 points minimum to continue the access procedure)	

Preparation of the welding operation	**Check**
- Health and safety:	
o wear / hold the suitable protective equipment / clothing according to the welding process[5)]	Success / failed
- Materials and consumables:	
o pick-up / check the suitability of the right filler material[5)]	Success / failed
o pick-up / check the suitable shielding gas (if applicable)[5)]	Success / failed
o pick-up / check the suitable tungsten electrode, and grind it (if applicable)[5)]	Success / failed
- Welding power source:	
o check the good condition of the welding power source, welding cables and "welding gun"[5)]	Success / failed
o check if the connection of the welding cables on the power source are ok[5)]	Success / failed
o check if gas cylinder, pressure reducer, flowmeter, pipes are correctly connected (if applicable)[5)]	Success / failed
o mount the wire spool, check / mount / adjust the drive rolls, insert the wire in the feed system (if applicable)[5)]	Success / failed
o adjust the welding parameters[6)]	Success / failed

Welding of the test piece	**Check**
- mount and tack the pieces together according to the WPS[5)]	Success / Failed
- manage properly the restart of welds[5)]	Success / Failed
- keep the test object in the specified welding[5)]	Success / Failed

Note [5)] - A failure will stop the access to the "Experienced route".

Note [6)] - A failure will NOT stop the access to the "Experienced route".

Appendix 3

Reference standards (latest revision)

EN 169	filter glasses
EN 1089-3	marking of gas cylinders
ISO 4063	Welding and Allied processes
ISO 9606-1	qualification of welders
ISO 636	consumables for TIG for non-alloy and fine grain steels
ISO 2553	welding symbols
ISO 2560	covered electrodes for non-alloy and fine grain steels
ISO 5817	quality levels
ISO 6848	TIG electrodes
ISO 14175	shielding gases
ISO 14341	solid wires for MAG for non-alloy and fine grain steels
ISO/TR 15608	material grouping
ISO 17632	tubular cored electrodes for non-alloy and fine grain steels
ISO 17637	visual testing of fusion-welded joints

Or Equivalent