

# Welding

## 1. Final task assignment

Contestants will have to perform 3 different welding tasks.

It is required to assemble and weld the following:

- ✓ 3 carbon steel welding specimens
- ✓ 1 structure made of aluminum alloy
- ✓ 1 pipe made of stainless steel

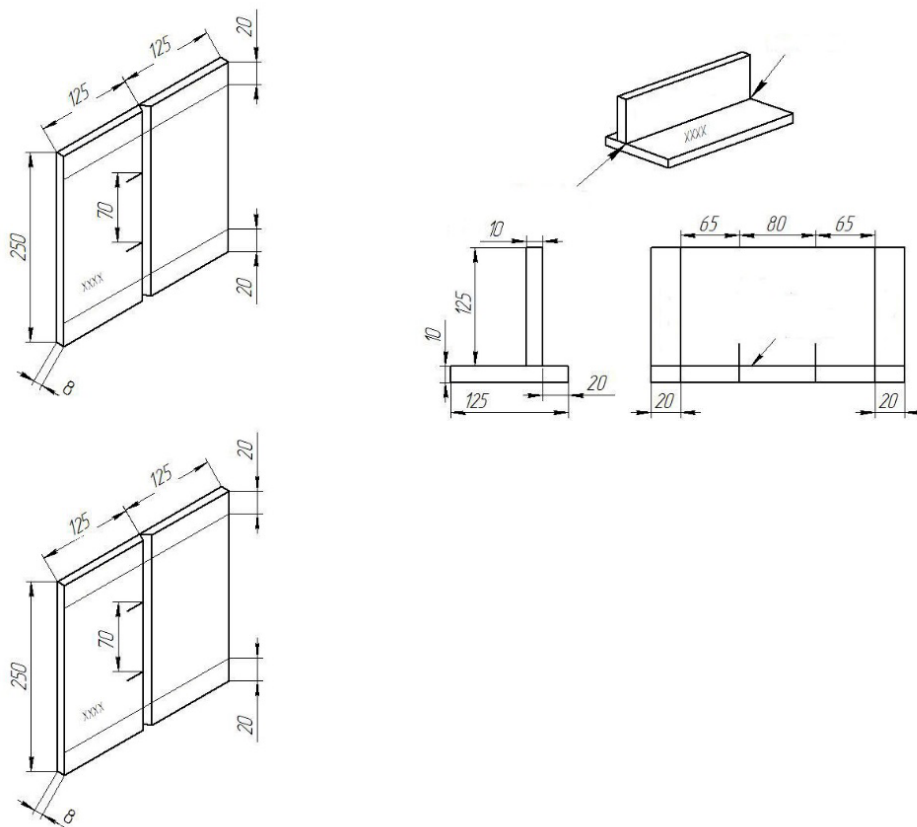
### **Module 1: Three carbon steel welding specimens**

**Allocated time:** 2 hours 30 minutes.

Contestants will assemble and weld three welding tests according to the drawings.

1. Welding sample of butt joint of two plates, 8 mm thick of carbon steel (Stal 3) in horizontal position (PC), the welding is carried out in horizontal position.
2. Welding sample of butt joint of two plates, 8 mm thick of carbon steel (Stal 3) in vertical position B1(PF), the welding is carried out from the bottom to the top. Bevel of each of two edges is 30°.
3. Welding sample of T-joint of two plates, 10 mm thick of carbon steel (Stal 3) bottomhand H2(PB), without bevel, gap max. 2 mm, leg length is  $11.3 \pm$  mm, welding is carried out in 2-3 runs.

Welding types are determined by toss (MMA, TIG, MAG).



## **Module 2. One structure made of aluminum alloy**

**Allocated time:** 2 hours 30 minutes.

Contestants will assemble a structure made of aluminum alloy AMg 2.5 using stick welding with coated electrode welding method (TIG) as per drawings.

Compliance with plans provided.

### **Special instructions:**

- ✓ Welding of all vertical seams is carried out from the bottom to the top.
- ✓ All fillets are made in one run with filling wire.

### **Task assignment evaluation:**

- ✓ Visual and dimensional test.

Structure – bracket.

Blanks without bevels, plates 3 mm thick, the structure fully fits in a cube of 250 mm.

All types of spatial positions except for overhead one.

Compliance with welding positions. The part must remain on its base during welding.

Task performance sequence:

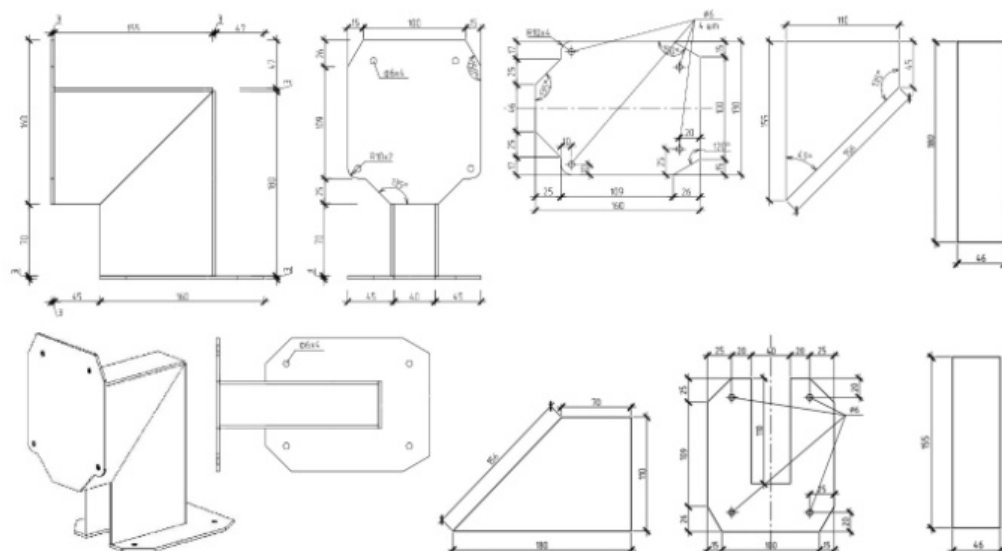
- ✓ Prepare metal for welding (clean and degrease).
- ✓ Assemble the structure with tick weld.
- ✓ Carry out the welding.

Task assignment evaluation:

- ✓ Visual and dimensional test.

## Types of welding in Module 2:

- ✓ 141



### **Module 3. One pipe made of stainless steel**

**Allocated time: 1 hour.**

Contestants will weld two pipe cut-offs made of stainless steel, in a certain spatial position PC using TIG method as per drawings. Sizes: sample total size Ø 114x110x3.05 mm.

Task assignment evaluation:

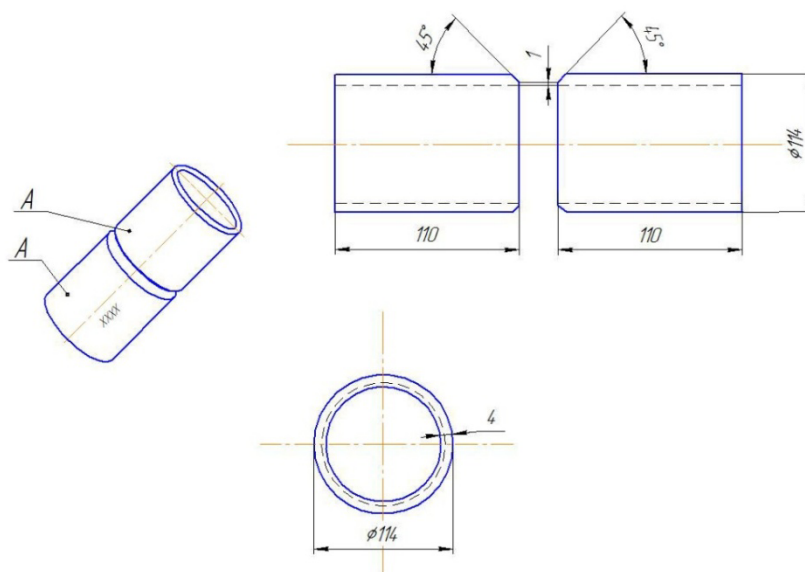
- ✓ Visual and dimensional test.

Task performance sequence:

- ✓ Prepare blanks for welding (clean and degrease).
- ✓ Assemble the check sample with tick weld.
- ✓ Carry out the welding.

Types of welding in Module 3:

- ✓ 141 (argon arc welding with non-consumable electrode).



## 2. Allocated time: 6 hours 00 minutes

6 hours of competition.

## 3. Requirements

- ✓ Contestants must respect the safety rules.
- ✓ PPE is mandatory: welding gloves, welding helmet, safety glasses, safety shoes, work clothes.
- ✓ Contestants are not allowed to lend or to borrow any tool or material during the competition.
- ✓ Any contestant caught cheating, talking to someone from the public or using a communication device will suffer a penalty of 5 points for the first transgression. A second transgression will lead to an exclusion from the contest.

#### 4. Procedure

**Day -1 (March 23<sup>rd</sup>):** On the day before the competition, contestants will be welcomed on the stand by the members of the jury. A briefing about the organization of the competition and the safety rules will be arranged. Contestants will draw lots to be assigned to a work station, where they may drop off their tools. The competition will be organized in two groups. Contestants from a same delegation will inevitably be placed in the same group.

##### Composition of the groups

Group 1: 2 contestants	Group 2: 2 contestants
France, 1 contestant	Korea, 1 contestant
Canada, 1 contestant	Kenya, 1 contestant

**Day 1 (March 24<sup>th</sup>):** In the morning, contestants from group 1 will have 2 hours 30 minutes to complete the module 1. In the afternoon, contestants from group 2 will have 2 hours 30 minutes to complete the module 1.

**Day 2 (March 25<sup>th</sup>):** In the morning, contestants from group 2 will have 3 hours 30 minutes to complete modules 2 and 3. In the afternoon, contestants from group 1 will have 3 hours 30 minutes to complete modules 2 and 3.

#### 5. Evaluation criteria

N°	Items to be evaluated	O/S	Scoring scale
<b>1 - Tole BW PF</b>			<b>22</b>
01	Regularity of welded bead <i>Régularité du cordon soudé</i>	S	2
02	Continuous undercut and/or intermittent undercut - ≤ 0,5mm 1 defect: 1 pt. - 2 defects: 0 pt. <i>Morsure et caniveaux - ≤ 0,5mm - 1 défaut : 1 pt - 2 défauts : 0 pt</i>	P	2
03	Free from stray arc strikes - 1 defect: 0 pt. <i>Absence de coup d'arc - 1 défaut : 0 pt</i>	O	1
04	Absence of smoke and/or projection <i>Absence de fumée et/ou projection</i>	O	1
05	Is the weld metal free of porosity <i>Absence de soufflures débouchante</i>	O	1
06	Incompletely filled groove not allowed <i>Sous épaisseur du cordon endroit non autorisé</i>	O	2

07	Excess weld metal - $h \leq 1\text{mm} + 0,1 b$ but max 5mm <i>Sur épaisseur du cordon endroit - <math>h \leq 1\text{mm} + 0,1 b</math> mais Max 5mm</i>	O	2
08	Incomplete root penetration not allowed <i>Sous épaisseur de cordon envers non autorisé</i>	O	2
09	Excess penetration - $h \leq 1\text{mm} + 0,1 b$ <i>Sur épaisseur du cordon envers - <math>h \leq 1\text{mm} + 0,1 b</math></i>	O	2
10	Absence solid inclusion <i>Absence d'inclusion solide</i>	O	1
11	Front folding - defect $\geq 3\text{mm}$ not allowed - 1 defect: 2 pts - 2 defects: 1 pt.- 3 defects: 0 pt. <i>Pliages endroit - défaut <math>\geq 3\text{mm}</math> non autorisé - 1 défaut : 2 pts - 2 défauts 1 pts - 3 défauts : 0 pt</i>	P	3
12	Back folding - defect $\geq 3\text{mm}$ not allowed 1 defect: 2 pts - 2 defaults: 1 pt. - 3 defects: 0 pt. <i>Pliages envers - défaut <math>\geq 3\text{mm}</math> non autorisé - 1 défaut : 2 pts - 2 défauts 1 pts - 3 défauts : 0 pts</i>	P	3
<b>2 - TOLE BW PC</b>			<b>22</b>
13	Regularity of welded bead <i>Régularité du cordon soudé</i>	S	2
14	Continuous undercut and/or intermittent undercut - $\leq 0,5\text{mm}$ 1 defect: 1 pt. - 2 defects: 0 pt. <i>Morsure et caniveaux - <math>\leq 0,5\text{mm}</math> - 1 défaut : 1 pt - 2 défauts : 0 pt</i>	P	2
15	Free from stray arc strikes - 1 defect: 0 pt. <i>Absence de coup d'arc - 1 défaut : 0 pt</i>	O	1
16	Absence of smoke and/or projection <i>Absence de fumée et/ou projection</i>	O	1
17	Is the weld metal free of porosity <i>Absence de soufflures débouchante</i>	O	1
18	Incompletely filled groove not allowed <i>Sous épaisseur du cordon endroit non autorisé</i>	O	2
19	Excess weld metal - $h \leq 1\text{mm} + 0,1 b$ but max 5mm <i>Sur épaisseur du cordon endroit - <math>h \leq 1\text{mm} + 0,1 b</math> mais Max 5mm</i>	O	2
20	Incomplete root penetration not allowed <i>Sous épaisseur de cordon envers non autorisé</i>	O	2
21	Excess penetration - $h \leq 1\text{mm} + 0,1 b$ <i>Sur épaisseur du cordon envers - <math>h \leq 1\text{mm} + 0,1 b</math></i>	O	2
22	Absence solid inclusion <i>Absence d'inclusion solide</i>	O	1
23	Front folding - defect $\geq 3\text{mm}$ not allowed - 1 defect: 2 pts - 2 defects: 1 pt.- 3 defects: 0 pt. <i>Pliages endroit - défaut <math>\geq 3\text{mm}</math> non autorisé - 1 défaut : 2 pts - 2 défauts 1 pts - 3 défauts : 0 pt</i>	P	3
24	Back folding - defect $\geq 3\text{mm}$ not allowed 1 defect: 2 pts - 2 defaults: 1 pt. - 3 defects: 0 pt. <i>Pliages envers - défaut <math>\geq 3\text{mm}</math> non autorisé - 1 défaut : 2 pts - 2 défauts 1 pts - 3 défauts : 0 pts</i>	P	3

3 - TOLE FW PB			15
25	Respect throat thickness of 8mm $\pm$ 1mm 1 defect: 0 pt. <i>Apothème de 8mm <math>\pm</math> 1mm Respecté - 1 défaut : 0 pt</i>	O	2
26	Regularity of welded bead <i>Régularité du cordon soudé</i>	S	2
27	Free from stray arc strikes <i>Absence de coup d'arc</i>	O	1
28	Absence of smoke and/or projection <i>Absence de fumée et/ou projection</i>	O	2
29	Continuous undercut and/or intermittent undercut - $\leq$ 0,5mm 1 defect: 1 pt. - 2 defects: 0 pt. <i>Morsure et caniveaux - <math>\leq</math> 0,5mm - 1 défaut : 1 pts - 2 défauts : 0 pts</i>	P	2
30	Incorrect weld toe $\geq 110^\circ$ <i>Angle de raccordement du cordon <math>\geq 110^\circ</math></i>	O	2
31	2 macroscopies - defect $\geq 3$ mm not allowed 1 defect: 2 pts - 2 defects: 1 pt. - 3 defects: 0 pt. <i>2 Macroscopies - défaut <math>\geq 3</math>mm non autorisé - 1 défaut : 2 pts - 2 défauts : 1 pt - 3 défauts : 0 pt</i>	P	4
4 - STRUCTURE ALUMINIUM			22
32	Regularity of welded bead butt weld <i>Régularité des cordons de soudure BW</i>	S	1
33	Regularity of welded bead fillet weld <i>Régularité des cordons de soudure FW</i>	S	1
34	Continuous undercut and/or intermittent undercut - $\leq$ 0,5mm 1 defect: 1 pt. - 2 defects: 0 pt. <i>Morsure et/ou caniveau - <math>\leq</math> 0,5mm - 1 défaut : 1 pts - 2 défauts : 0 pts</i>	P	2
35	Loopback and/or recovery not allowed in corners <i>Bouclage et/ou reprise non autorisé dans les angles</i>	O	3
36	Free from stray arc strikes 1 defect: 1 pt. - 2 defects: 0 pt. <i>Coup d'arc parasite - 1 défaut : 1 pt - 2 défauts : 0 pts</i>	P	2
37	Porosity and/or inclusion <i>Soufflure débouchante et/ou inclusion</i>	O	1
38	Incompletely filled groove not allowed <i>Sous épaisseur non autorisé sur soudure BW endroit</i>	O	2
39	Respect the throat thickness or 3mm + 1 <i>Apothème des soudure d'angle respecté soit 3mm + 1</i>	O	2
40	100% welded weld joint <i>Joint de soudure 100% soudé</i>	O	1
41	Respect of welding positions <i>Respects des positions de soudage</i>	O	2
42	Structure drawing respected <i>Plan de la structure respecté</i>	O	1

43	Penetration of butt weld - 90%: 4 pts - 50%: 2 pts - 20%: 0 pt. <i>Pénétration des soudures BW - 90% : 4 pts - 50% : 2 pts - 20% : 0 pt</i>	P	4
<b>5 - TUBE BW PC</b>			<b>16</b>
44	Regularity of welded bead <i>Régularité du cordon de soudure</i>	S	2
45	Incompletely filled groove not allowed <i>Sous épaisseur de cordon endroit non autorisé</i>	O	2
46	Continuous undercut and/or intermittent undercut - $\leq 0,5\text{mm}$ - 1 defect: 1 pt. - 2 defects: 0 pt. <i>Morsure et/ou caniveau - <math>\leq 0,5\text{mm}</math> - 1 défaut : 1 pt - 2 défauts : 0 pt</i>	P	2
47	Free from stray arc strikes - 1 defect: 0 pt. <i>Coup d'arc parasite - 1 défaut : 0 pt</i>	O	1
48	End crater pipe not allowed - 1 defect: 0 pt. <i>Cratère, retassure, non autorisé - 1 défaut : 0 pt</i>	O	2
49	Incomplete root penetration not allowed <i>Manque de pénétration non autorisé</i>	O	1
50	Excess weld metal - $h \leq 1\text{mm} + 0,1 b$ <i>Sur épaisseur du cordon endroit - <math>h \leq 1\text{mm} + 0,1 b</math></i>	O	3
51	Excess penetration - Max 2 mm <i>Sur épaisseur du cordon envers - Max 2 mm</i>	O	3
<b>6 - SECURITE</b>			<b>3</b>
52	Respect the equipment provided <i>Respect du matériel mis à disposition</i>	O	1
53	Relevant PPE (personal protective equipment) used (glasses, ear plugs, gloves, safety shoes, long sleeves clothes) <i>Port des EPI (lunettes, protection auditive, gants, chaussures de sécurité, vêtements à manches longues)</i>	O	1
54	Work zone clean and tidy <i>Zone de travail propre et rangé</i>	O	1
<b>TOTAL</b>			<b>100</b>

Standard:

