Provincial Scope Document

WELDING (Post Secondary) 2017

Contest Length: 5 hrs

Check in time Heat 1: 6:15am contest area Contest Start: 6:30am

Sponsors: Lincoln Electric Canada, PRAXAIR

Purpose of the Challenge:

Assess the contestant's ability in the field of welding. Contestants must demonstrate their knowledge in reading drawings and interpreting welding symbols, and mastery of the main welding processes used in today's industry.

Skills & Knowledge to be Tested:

Based on technical drawings and welding processes, contestants will be assessed on the assembly and welding of projects in all positions, and on cutting exercises.

PRACTICAL

Post-Secondary
Shielded Metal Arc Welding (SMAW).
Gas Metal Arc Welding (GMAW).
Flux-Cored Arc Welding (FCAW).
Gas Tungsten Arc Welding (GTAW).

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THEORY

The theory portion of the contest is limited to the knowledge required to complete practical work. These knowledge requirements are included in the contest for assessment purposes and involve the following aspects:

• reading drawings;	• adjusting welding machines;
• interpreting welding symbols;	• safety regulations.
• knowledge of basic metals and filler metals;	

Note:

All measurements are shown in Metric (mm).
All orientations, instructions and drawings are to be given in English

Students will be expected to:

- Start and use the welding equipment supplied by the organizer, following the appropriate safety regulations.
- Check that the dimensions of the materials are in accordance with the material list and the prints/drawings.
- Prepare the materials by filing where appropriate
- Assemble the materials in accordance with the drawings provided.
- Utilize their practical skills in drawing interpretation, fitting and welding.
- Demonstrate an ability to read blueprints and interpret welding symbols.
- Have a working knowledge of electrode classification and identification.
- The practical and theoretical components for post secondary students are based on sections from C, B or A level training, including SMAW, GTAW, GMAW and FCAW.

Contest Description:

TASKS:

Post-Secondary

Welding on Mild steel structures:

SMAW: Plate or pipe
Root: E41010 (E6010) 3.2mm (1/8") dia.
Fill and cap: E48018 (E7018)
3.2mm (1/8") dia.
Fillets: 2F, 3F, 4F, E48018 (E7018)
3.2 and 4.0mm (1/8 and 5/32") dia.

GMAW: 2G pipe or plate
3F (vertical up/down)
5F
1G
FCAW: 2F, 3F,

GTAW: 1G, 2G, 2F, 3F

Welding on Stainless steel or Aluminum,
structures: GTAW: 2F, 3F, 5F

JOINTS CAN BE PLATES AND/OR PIPE OR BOTH

Basic Materials:

Post-Secondary

Low- carbon steel:
Plate thicknesses: 6.4 - 9.5mm (1/4" - 3/8")

Pipe: Sch 40 or Sch 80
Diameters: 50 to 100mm (2" to 6")

FILLER MATERIALS

SMAW = E43010 (E6010), 3.2 and 4.0 mm (1/8" and 5/32") dia.
E49018 (E7018) 3.2 and 4.0mm dia.
(1/8" and 5/32")
GMAW = ER490S6 (ER70S6) 0.9mm (0.035") dia.
FCAW = E4901T-9-CH (E71T-1) 1.2mm (0.045"), 1.6 mm (1/16") dia.
GTAW = R490S-3 (R70S-3) 1.6 and 2.4mm
(1/16" and 3/32") dia.
E308 or E316 1.6 and 2.4mm dia.
(1/16" and 2.4")
Tungsten electrode: EWTH-2, 2.5 mm (3/32") dia.

SHIELDING GASES

GMAW = 75% Ar + 25% CO_2;
FCAW = 75% Ar + 25% CO_2;
GTAW = Argon

Safety Requirements:

Safety awareness/requirements will be maintained within Worksafe BC standards at all times. A contestant will not be allowed to compete without the safety equipment noted on this scope document.

Clothing / Equipment / Tools / Materials

Clothing (to be provided by the contestant):

- Appropriate work clothes;
- CSA-approved steel-toed boots;
- Welding gloves;
- Safety goggles;
- Ear plugs or protectors;
- Helmet, #10 and/or #11 and/or #12 lens.
- Speed lenses are permitted.

Note: Contestants who do not have the required protective gear will not be allowed to participate in the contest.

Provided by the organizing committee

- Welding machines and accessories
- Drawings and instructions
- All basic materials required to complete projects
- Scrap plate
- All filler materials

Provided by the contestant and is <u>limited</u> to the following tools:

• Protective gear listed previously	• Chipping hammer
• Measuring tape, millimetres and inches	• Steel wire brush
• Soap stone	• dividers
• Lead pencil	• Ball peen hammer
• Centre punch	• All-purpose pliers/side cutters
• Cold chisel	• Vice grips (standard)
• 12" Combination square (45˚ / 90˚)	• Magnet(s)
• Fillet weld gauge	• 10 inch mill file, bastard cut
Toolbox to contain the above items	

Judging / Distribution of Marks:

EVALUATION

Post-Secondary
SMAW
GMAW
GTAW
FCAW
GENERAL WORKMANSHIP
SAFETY

Judges shall be from industry and educational institutions; however they will not have a student participating in the contest.

ADDITIONAL INFORMATION WILL BE PROVIDED DURING CONTEST ORIENTATION

Advisors, instructors, etc. are not permitted to speak to their contestants during the competitions.

ALL CONTEST MATERIALS, INCLUDING DRAWINGS MUST REMAIN AT THE CONTEST SITE FOR THE DURATION OF THE CONTEST.

Technical Committee:

BC Technical Chairs:
David Helman (David_Helman@bcit.ca)
Pat McGurk (Pat.McGurk@ufv.ca)

Technical Committee members:

Al Sumal Kyle Bramhoff
John Jaques William Small

Skills Canada BC reserves the right to update contest information. Please check the website for changes.