Essential Skills and Apprenticeship

Using Essential Skills: On the Job with a Welder

Are you starting an apprenticeship in welding or are you thinking about a career in this trade? Pursuing a career as a welder requires strong essential skills such as reading, document use, numeracy and critical thinking.

Use this booklet to:

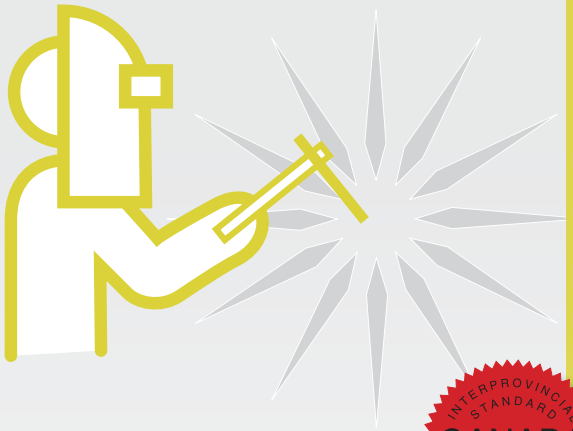
- learn how welders use essential skills;
- follow the daily routine of a welder; and
- find out how your essential skills compare to those of a journeyperson in welding.

How welders use essential skills

Welders use essential skills to perform a variety of job-related tasks, for example:

- **document use** to read drawings, meet specifications and fill in logs;
- **numeracy** to measure distances between welds or to calculate dimensions; and
- **thinking** to decide what materials to use and to determine the best way to proceed with a weld to avoid problems.

Welder



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Essential Skills

Reading
Document Use
Numeracy
Writing
Oral Communication
Working with Others
Thinking
Computer Use
Continuous Learning

Welders use welding equipment to join together structures and components made of ferrous (iron-containing) or non-ferrous metal. They work for welding contractors, welding shops and companies that manufacture metal products such as structural steel, platework, boilers, heavy machinery, aircraft and ships. They may also be self-employed.

A day in the life of a welder: Mike's story

Attending a safety meeting

Mike is an oil pipeline welder. Pipeline welding requires accuracy and precision because of the flammable nature of the oil being moved along the pipes. Mike's job is to weld pipes together to make the joints as secure and safe as possible. The welds must be able to withstand both the pressure from the oil inside the pipe and the environmental conditions outside it.

Before Mike starts his first task, he is required to attend a safety orientation for the site. At the orientation, a safety officer reviews safety issues relevant to the site and goes over any other safety announcements. Today the safety officer talks to the welders about working in a new location along the pipeline. Mike and the other welders are encouraged to ask questions and discuss issues that concern them *(oral communication)*. After the orientation, they sign a form to show that they participated *(document use)*.

Reading the drawing

Mike reads a weld drawing to get information about the weld he needs to perform. He discusses potential problems and any concerns he might have with his supervisor *(oral communication)*.

Choosing an electrode

Mike's supervisor tells him which electrode he needs to use for the weld he is about to perform *(oral communication)*. An electrode is a piece of conductive metal that will spark, or create a welding arc, when activated with electrical current. The arc melts both the surface of the pipeline segments and the electrode itself to join the pipeline segments permanently. Two classification systems are used to identify electrodes: one is produced by the American Welding Society and the other by the Canadian Standards Association. Mike learned both systems during his training. He goes to the holding oven where the electrodes are kept dry and free of moisture and he finds the one he needs by reading the classification numbers marked on the electrodes *(thinking skills – decision making)*.

Determining the type of weld

Mike looks at the symbols on the drawing to find out what kind of weld he needs to do *(document use)*. He sees that he has to perform V-groove welds and bevel groove welds to join these pipes.

Weld symbols

Fillet	Plug or Slot	Spot or Projection	Seam	Back or Backing	Surfacing	Flange	
						Edge	Corner

Groove Welds						
Square	V	Bevel	U	J	Flare-V	Flare-Bevel

Wearing protective gear

Before he starts welding, Mike makes sure he is wearing the correct protective gear. He puts on gloves and safety glasses because the light given off by the welding torch is bright enough to damage his eyes. He usually keeps his safety glasses on even when he is not welding because the light from his coworkers' welding torches can be just as damaging. Mike also wears a respirator during the weld because the fumes given off can be very dangerous. These safety measures are posted around the site and Mike's supervisor reminds him about them from time to time *(document use, oral communication)*.

Cleaning the weld zone

Next, Mike makes sure that the pipe is free of oil, grease and paint. This is very important, because these substances can create unpleasant and dangerous fumes if they are present during the weld. “Slag” from previous welds also needs to be removed. Slag is the by-product produced when two metals are welded together. It forms a barrier against the elements that protects the welded joint, but it must be removed before a new weld is performed. By reading the notes on the drawing, Mike can see that the pipes need to be cleaned with a grinder and a wire brush *(reading)*.

Dealing with contamination

Mike tries to keep the weld zone as clean as possible because contamination in a weld can lead to problems like cracks or porosity. While performing the weld, Mike discovers that the welding arc has become contaminated with dust particles. As soon as he realizes what has happened, he stops welding and consults the drawing to find out which tool he needs to remove the weld he has done *(thinking skills – problem solving)*. He reads that he needs to use a grinder to clean out, or “back-gouge,” the weld *(reading)*. Joints on a pipeline must be welded to meet strict specifications; all the welds Mike does are tested by X-ray to make sure they meet quality standards. On-site inspectors process the X-rays inside a portable dark room. If the X-rays reveal any flaws, the weld must be repaired or redone.

Filling in the welder’s log

At the end of each weld, Mike has to fill in the welder’s log, which is a record of every weld done on the site *(document use)*. This record shows the employer what welds have been performed that day. It also ensures that both the employer and the welder have a written record of what work has been done in case something goes wrong.

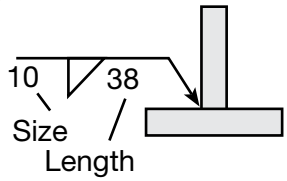
Do you have the essential skills to be a welder?

Complete the following questions to see how your skills compare to those of a journeyperson in welding. (Answers on page 4.)

1. Welding symbols

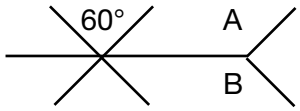
Welders learn to read welding symbols during their technical training. Welding symbols tell them everything they need to know to perform the weld, including the type, size and length of the weld.

Look at the illustration below and the weld symbols on page 2. Which type of weld does the welder need to perform?



2. Welder’s log

Look at the weld symbols on page 2 to fill in the weld name and type for weld A in the image shown below.

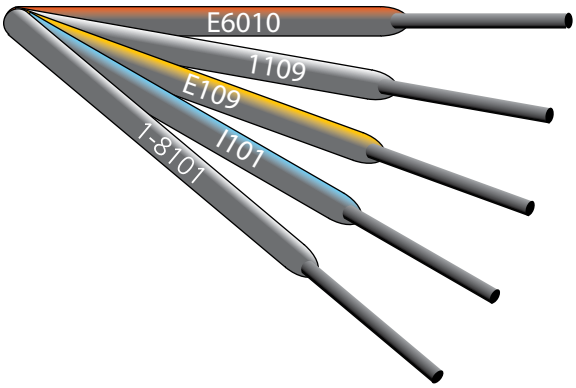


Welder’s Log

Piece	Weld name	Weld type
Pipe assembly		

3. Choosing electrodes

Classification numbers are marked on each electrode to ensure that the correct one is used for each weld. A welder needs to use an E6010 electrode for one of his welds. Circle the electrode he will use.



Answers

1. **Welding symbols** *(document use)*

   A fillet weld is needed.

2. **Welder's log** *(document use)*

Piece	Weld name	Weld type
Pipe assembly	A	V-groove

3. **Choosing electrodes** *(thinking skills – decision making)*

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