**Welding**

**Description of the associated work role(s) or occupation(s)**

Welding is a critical process that is controlled by both national and international standards and specifications to regulate the quality of the deposited weld metal and the skill of the welder.

A welder prepares and joins a range of metals and metallic alloys using mainly processes where an electric arc is the heat source. Electric arc processes utilize a gas shield or a flux to protect the molten weld area from contamination by the surrounding atmosphere. A welder needs to be able to interpret engineering drawings, standards and symbols and correctly translate these requirements into accurate structures and fabrications.

Welders need to have a thorough knowledge and understanding of safe working practices, personal protection equipment and the hazards and practices associated with the welding and fabrication industries. They need to gain specific knowledge of a wide range of welding equipment and processes as well as an understanding of how welding will affect the structure of the material being welded. They need to be familiar with electricity and how it is utilized for welding.

A welder prepares, assembles and joins a wide range of metals and metal alloys using various welding processes including manual metal arc welding, shielded metal arc welding, metal arc gas shielded welding, gas metal arc welding, tungsten arc gas shielded welding, gas tungsten arc welding, and flux cored arc welding. A welder will use mainly processes where the heat utilized for welding will be an electric arc to join a range of materials including the commonly joined and fabricated materials – carbon steel, stainless steels, aluminium and copper and their associated alloys. They must be able to select the correct equipment, process variables, and welding technique, depending upon the material being joined.

Welders may use thermal cutting processes and should be able to identify the correct preparation for joining as applied to the type, thickness and intended use of the joint. They use grinding and cutting equipment to prepare welded joints. Modern methods of joining, as well as those noted above, include mechanized processes such as submerged arc, plasma arc, stud welding, and laser welding.

Welders join sections, pipe and plate and fabricate large and small pressure vessels. A welder can work in a unit or factory which produces fabrications and/or structures for industries as diverse as civil engineering, mechanical engineering, transport, marine engineering, construction, service, and leisure industries. Welders also work on site preparation, construction, and the repair and maintenance of structures. A welder can work in many locations and situations, ranging from a bench in a factory, to shipyards, power stations and off-shore structures. Welders also work in engineering, construction, power generating, and petro-chemical plants. The working environment may include hazards such as being off-shore, with extreme weather conditions and also in confined spaces where access to the joint to be welded is restricted.

The modern welder may specialize in one or a number of welding processes and environments. They may also be asked to work on exotic alloys such as duplex and super duplex stainless steels and cupronickels. Welders are required to carry out the finest work where faults and failure may have the most serious consequences in terms of cost, safety, and environmental damage.