

Welding Procedure Specification

1. Introduction

For a given application, the main way of ensuring adequate weld quality is to specify the procedure and the skill level of the welding operator. Here, the alternative routes for welding procedure approval are described together with the requirements for welder or welding operator approval.

2. Technical subject

The key document is the Welding Procedure Specification (WPS) which details the welding variables to be used to ensure a welded joint will achieve the specified levels of weld quality and mechanical properties. The WPS is supported by a number of documents, which together comprise a welding approval record termed the WPAR (BS EN ISO 15614) or PQR (ASME). In both the European and ASME standards, there are a number of 'essential variables' specified which, if changed, may affect either weld quality or mechanical properties. Therefore, a change in any of the essentials will invalidate the welding procedure and will require a new approval test to be carried out.

The route followed to produce a WPS in BS EN ISO 15614 and the responsibilities of the manufacturer and the Examiner/Examining Body are shown in Fig.1. The most common method of gaining approval is to carry out an approval test as described in BS EN ISO 15614-1 (steels) and 15614-2 (aluminium and its alloys). The manufacturer initially drafts a preliminary welding procedure (pWPS) which is used by one of the manufacturer's competent welders to prove that it is capable of producing a welded joint to the specified levels of weld quality and mechanical properties. The welding procedure approval record (WPAR) is a record of this weld. If the WPAR is approved by the Examiner, it is used to finalize one or more WPSs which

is the basis for the Work Instructions given to the welder.

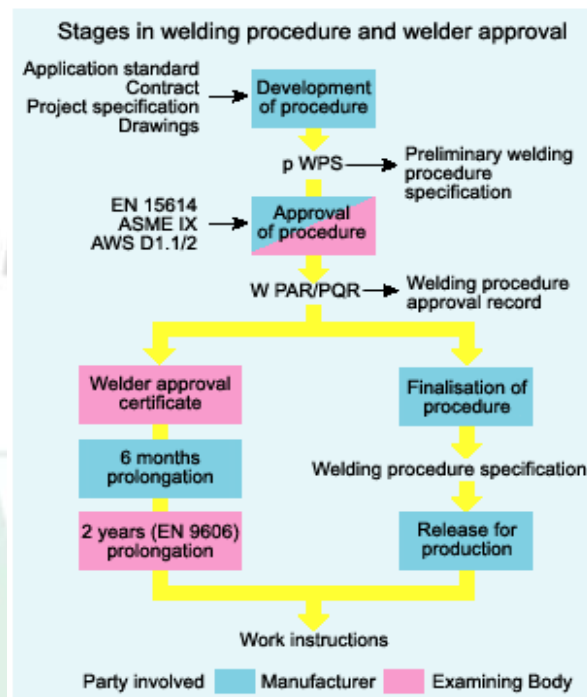


Fig.1 - Stages in welding and welder approval



Fig.2 - AC TIG welding of aluminium cryogenic pressure vessel

3. Relevant standards

- BS EN 287-1:2004 - Qualification test of welders;
Specification and qualification of welding procedures for metallic materials
- BS EN ISO 15614 - Welding Procedure test;
- BS EN ISO 15612:2004 - Qualification by adoption of a standard welding procedure;
- BS EN ISO 15610:2003 - Qualification based on tested welding consumables;