

Procedure No: CS-WELD-1002  
 TRIM Ref No: B/D/08/3091  
 Reviewed: 02/23  
 Amended: 02/23  
 Review Due: 02/25



## CS ENERGY PROCEDURE

# PRESSURE WELDING FRAMEWORK CS-WELD-1002

Responsible Officer: Asset Integrity Specialist  
 Responsible Manager: Head of Unit Plant Engineering  
 Responsible Executive: Executive General Manager Asset Management

---

### DOCUMENT HISTORY

| Key Changes   | Prepared By     | Checked By | Approved By   | Date       |
|---|-----------------|------------|---------------|------------|
| Original Issue  | Welding Officer |            | GM Production | 05/02/1998 |
| Rev 01- Reference to Plant Responsible officer changed to Welding Officer. Rewording of last paragraph in 3.3. Callide File numbers changed in 3.5. Rewording of paragraphs 3.6 and 3.8. Paragraph added to 4. Definitions. |                 |            |               | 14/08/1998 |
| Document transferred to new CS Energy template  | L Bartlett      |            |               | 03/11/2014 |
| Updated Standards references, included Responsibilities and Competency statement. and Quality Criteria Assistance.  | B Hazard        | T Vonhoff  | I Rawlings    | 10/02/2023 |
|   |                 |            |               |            |
|   |                 |            |               |            |

## CONTENTS

|    |  |    |
|----|--|----|
| 1  | <b>PURPOSE</b> .....   | 3  |
| 2  | <b>SCOPE</b> .....   | 3  |
| 3  | <b>DEFINITIONS</b> .....   | 3  |
| 4  | <b>RESPONSIBILITIES AND COMPETENCY</b> .....                           | 4  |
| 5  | <b>HEALTH AND SAFETY</b> .....   | 4  |
| 6  | <b>WELDING SYSTEM</b> .....  | 5  |
|    | <b>6.1 Documentation</b> .....   | 5  |
|    | 6.1.1 <i>Registered Procedures</i> .....                               | 5  |
|    | 6.1.2 <i>Registered Forms</i> .....                                    | 5  |
|    | 6.1.3 <i>Records</i> .....   | 6  |
|    | 6.1.4 <i>Reference Documentation</i> .....                             | 6  |
|    | <b>6.2 Welding Procedure Qualification Records (PQR)</b> .....         | 6  |
|    | <b>6.3 Welding Procedure Specification (WPS)</b> .....                 | 7  |
|    | <b>6.4 Weld Instructions</b> .....                                     | 7  |
|    | <b>6.5 Welder Qualification</b> .....                                  | 7  |
|    | <b>6.6 Destructive and Non-Destructive Testing</b> .....               | 8  |
|    | <b>6.7 Contractors</b> .....   | 8  |
|    | <b>6.8 Quality Records</b> .....                                       | 9  |
| 7  | <b>PROCESS FLOW</b> .....  | 10 |
| 8  | <b>REFERENCES</b> .....  | 11 |
| 9  | <b>RECORDS MANAGEMENT</b> .....  | 11 |
| 10 | <b>ATTACHMENTS</b> .....   | 12 |
|    | <b>10.1 Attachment 1 – Selection Quality Criteria Assistance</b> ..... | 12 |

## 1 PURPOSE

The purpose of this procedure is;

- To establish and maintain a uniform pressure equipment welding procedure and recording system and set minimum technical standards.
- To comply with the requirements of the Workplace Health and Safety Act and Regulations.
- To provide assurance to CS Energy that plant integrity will not be adversely affected by welding operations carried out on the plant.

## 2 SCOPE

CS Energy has plant designed and built to various international standards including Australian, American and European. This procedure utilises AS/NZS 1200 to assure compliance and integrity for welding activities at CS Energy sites.

This welding procedure and recording system, utilises elements of AS/NZS/ISO 3834 Quality requirements for fusion welding of metallic materials and AS 3992-Pressure Equipment welding and brazing qualification. It includes the documentation, approval and recording processes for welding manual documentation, welding procedure qualification records, welding procedures and welder qualification.

The use of other standards such as ASME BPVC-IX, ISO 15607, ISO 9606 (Parts 1 and 2) or ISO 15614-1 are deemed to be acceptable alternatives and compliant to AS/NZS 1200 and AS 3992, and therefore can be substituted by agreement.

Structural welding standards may also be used in accordance with this procedure.

## 3 DEFINITIONS

| Term               | Definition   |
|--------------------|--|
| AWCR               | Australian Welder Certification Register   |
| JSEA               | Job Safety & Environment Analysis  |
| MDR                | Manufacturers Data Report  |
| NDT                | Non-Destructive Testing  |
| PQR                | Procedure Qualification Record   |
| PQR number         | A unique number for the Procedure Qualification Record   |
| RPEQ               | Registered Professional Engineer Queensland  |
| RWC                | Responsible Welding Coordinator is a nominated person responsible for coordinating welding activities. This could be a Welding Supervisor, Welding Officer, Plant Engineer, RPEQ or Contractor |
| SWMS               | Safe Work Method Statement   |
| Welding Officer    | A person nominated to review welding processes and systems on all CS Energy sites. The present incumbent is Asset Engineering Specialist Integrity   |
| Welding Supervisor | A person nominated and qualified as a "Welding Supervisor" within the meaning of AS1796. This may be CS Energy or Contract personnel   |
| WHSQ               | Workplace Health and Safety Queensland   |
| WPS                | Welding Procedure Specification  |
| Weld Australia     | Weld Australia is the peak body representing the welding industry in Australia. Formally Welding Technology Institute of Australia (WTIA)  |

## 4 RESPONSIBILITIES AND COMPETENCY

CS Energy is responsible for all welding activities on their sites. CS Energy need to have systems and competent personnel undertaking welding and documentation activities.

The competent person who has acquired, through education, training qualification or experience, or a combination of these, the knowledge and skill enabling that person to perform the required task correctly and safely.

Responsible Welding Coordinator is a nominated person responsible for coordinating welding activities. This could be a Welding Supervisor, Welding Officer, Plant Engineer, RPEQ or Contractor.

## 5 HEALTH AND SAFETY

All welding activities shall comply with Workplace Health and Safety Act and Regulations, guidance will be taken from the WHSQ Code of Practice – Welding Processes.

This Code of Practice provides guidance on managing the risks of welding processes by following a method that involves:

- identifying the hazards
- if necessary, assessing the risks associated with these hazards
- implementing control measures
- reviewing control measures

The Code of Practice covers items such as:

- Airborne contaminants
- Radiation
- Electrical risks
- Fire and explosion
- Burns and exposure to heat
- Compressed and liquefied gases
- Noise
- Lead
- Other hazards
- Ventilation
- Personal protective equipment (PPE)
- Maintenance of equipment

Further guidance can be referenced from:

- Weld Australia Technical Note 7 - Health and Safety in Welding
- Weld Australia Technical Note 22 - Welding Electrical Safety
- Managing Electrical Risks in the Workplace Code of Practice
- AS 1674.2: Safety in welding and allied processes – Electrical
- AS 60974.1: Arc welding equipment – Welding power sources (Section 11 and 13 for hazard reducing devices).

## 6 WELDING SYSTEM

The welding system shall consist of, as a minimum, the following elements:

### Registered Procedures:

- Pressure Welding Framework (CS-WELD-1002)
- Procedure Qualification Records (PQR)
- Welding Procedure Specifications (WPS)

### Registered Forms:

- Welding Instructions / Non Destructive Testing Request
- Welder qualification and performance records

### Records:

- Weld compliance records; weld Instructions, Welder qualification, NDT reports, heat treatment records, hydrostatic tests, weld traceability maps, etc.
- CS Energy has inherited many PQR's and WPS's from previous Queensland power generation entities. CS Energy is also a member of the Weld Australia PG9 project that develops and shares PQR's between members of the project. CS Energy utilises these procedures in accordance AS 3992 Clause 3.6 and demonstrates and control application by review and formalising into registered procedures. This includes portability compliance.

### 6.1 Documentation

The Welding Procedure Manual has changed from a paper based manual, to an electronic format with referenced documentation stored in TRIM HP Records Manager.

#### 6.1.1 Registered Procedures

TRIM folder - [F/08/300](#) - CSE Registered Procedures - Plant - Welding / Weld, contains the following documents:

- Pressure Welding Framework (CS-WELD-1002)
- Procedure Qualification Records (PQR),
- Welding Procedure Specifications (WPS).

#### 6.1.2 Registered Forms

##### PQR and WPS forms

- S1585 PQR – New forms have been developed, to be approved.
- S1584 WPS – New forms have been developed, to be approved.

##### Welder Qualification

- S1583 – Welder Qualification form.

##### Welding Instructions/Non Destructive Testing Request forms

CS Energy has two forms for Weld instructions they are located in TRIM;

- [B/D/15/9316](#) - Form - PLANT - S1587 - Weld Instruction
- [B/D/13/19412](#) - Form - PLANT - S1588 - Weld Instruction and NDT Request

### 6.1.3 Records

**Completed Weld Instructions are to be saved in Folders for each of the generation sites:**

- [F/14/691](#) - GENERATION MAINTENANCE AND OPERATION - PLANNING (Maintenance) - Callide Power Station CAL - Weld Instructions
- [F/17/2290](#) - GENERATION MAINTENANCE AND OPERATION - PLANNING (Maintenance) - Kogan Creek Power Station KOG - Weld Instructions

**Titles of the Weld Instruction records shall be in the following format:**

“Weld Instruction – WIN [year] – [Next sequential Number for the year] Work Order [work order number] [KKS Number] – [Plant Description] – [Date xx Month Year]

Example; “Weld Instruction - WIN 2022-K002 - 4948754 - KA10LAB11AA405 - Boiler Feed Pump A Strainer Drain Valve - 27 January 2022”.

### 6.1.4 Reference Documentation

A Welding Procedure Reference Master spreadsheet, [B/D/10/21968](#) has been developed to allow procedure searches and material reference.

This spreadsheet supersedes the following documents.

| Record No                   | Superseded Document  |
|-----------------------------|--|
| <a href="#">B/D/08/3085</a> | REFERENCE - CS-WELD-1003 - Material Chemical Analysis - Boiler Maintenance - 1998                          |
| <a href="#">B/D/08/3087</a> | REFERENCE - CS-WELD-1004 - Material Chemical Analysis - Condensing and Feedheating Welded-in Valves - 1998 |
| <a href="#">B/D/08/3095</a> | REFERENCE - CS-WELD-1005 - Welding Procedure and Material Specification Index – Tubes - 1998               |
| <a href="#">B/D/08/3089</a> | REFERENCE - CS-WELD-1006 - Welding Procedure and Material Specification Index - Large Bore Pipe - 1998     |
| <a href="#">B/D/08/3092</a> | REFERENCE - CS-WELD-1007 - Welding Procedure and Material Specification Index - Socket Welds - 1998        |
| <a href="#">B/D/08/3093</a> | REFERENCE - CS-WELD-1008 - Welding Procedure and Material Specification Index - Pad Welds - 1998           |
| <a href="#">B/D/08/3088</a> | REFERENCE - CS-WELD-1009 - Welding Procedure and Material Specification Index - Branch Welds - 1998        |

### 6.2 Welding Procedure Qualification Records (PQR)

A PQR is a document to nominate and record weld test variables and contains test results to establish a welding procedure.

Welding procedure qualification records (PQR) generated by CS Energy shall be produced on CS Energy document S1585 and the test results added to the end of the document when recorded in TRIM. Other PQRs may be registered only if CS Energy has the legal rights to use the PQR. Examples of these are the PQRs received from the Weld Australia welding procedure PG9 project.

- PQRs shall be developed in compliance with AS 3992 and/or ASME IX.
- A PQR shall contain;
- technical information relevant to the weld,
- weld parameters, required for welding, heat treatment and a other welding associated processes
- identify the welder who qualified the procedure
- a record of all the process parameters used for each weld run during the welding processes
- the heat treatment, NDT, mechanical test reports, material and consumable certificates at the end of the approved document.

Once a PQR has been approved and registered in TRIM, including all parameter records and test results, then WPSs can be developed from the PQR.

### 6.3 Welding Procedure Specification (WPS)

A WPS is a documented qualified welding procedure prepared to provide direction for making production welds to the requirements of the applicable standards. A WPS is developed from an approved PQR.

Multiple WPSs can be developed from a PQR in accordance with AS 3992, complying with all the 'Essential Variables'. Once approved a WPS can be registered in TRIM and used for production welds.

### 6.4 Weld Instructions

The purpose of the Weld Instruction is to ensure that all conditions for welding are considered and that specific details are given to the Qualified Welder to carry out that work and any NDT required.

References in AS 3992-2020 Clauses 3.7, 3.8 & 3.9 and AS/NZS 3788-2006 Section 6 are to be considered in preparation of weld instructions. Considerations are to be given to new or aged materials and requirements of the weld procedure and NDT.

#### CS Energy has two forms for Weld instructions:

- [B/D/15/9316](#) - Form - PLANT - S1587 - Weld Instruction  
These weld instructions are issued to the welder/s where a contractor is to issue a NDT requests for weld compliance testing.
- [B/D/13/19412](#) - Form - PLANT - S1588 - Weld Instruction and NDT Request  
These Weld Instruction and NDT Requests are to be issued where CS Energy is to issue the NDT request for weld compliance testing. This document is issued to the welder/s and also to the NDT personnel, providing details for testing purposes.

The scanned copy of the weld instructions are to be saved in TRIM. Other documentation such as; welding procedure/s, drawings, and schedules can also be added to this record.

Titles of the Weld Instructions are to be in the following format;

Weld Instruction – WIN [year]–[next sequential Number for the year] - [work order number] - [KKS Number] [plant description] – [Date]

Example; Weld Instruction - WIN 2022-K012 - 5011897 - KA10HDD28BB002 - Fabric Filter B Cell 8 Pulse Tank 1 - 14 April 2022

#### Completed Weld Instructions are to be saved in Folders for each of the generation sites:

- [F/14/691](#) - GENERATION MAINTENANCE AND OPERATION - PLANNING (Maintenance) - Callide Power Station CAL - Weld Instructions
- [F/17/2290](#) - GENERATION MAINTENANCE AND OPERATION - PLANNING (Maintenance) - Kogan Creek Power Station KOG - Weld Instructions

In certain circumstances, it may be impractical to have an individual weld instruction for each weld. In this case, an alternative system may be used, provided it meets the following objectives:

- The persons carrying out the welding, heat treatment and NDT are fully aware of the details of the work.
- There is existing documentation which will link together the welder, work performed and all records pertaining to the work.

### 6.5 Welder Qualification

- Welders shall be qualified and current to the applicable standard.

- Welder qualification shall be in accordance with AS 3992. This standard also allows qualification by ASME IX or ISO 9606 Part 1.
- The welder's performance records shall be kept by the organisation employing the welder and accessible upon request by CS Energy. CS Energy shall keep a record of welder qualifications for CS Energy welders.
- The use of the Australian Welder Certification Register (AWCR) may be used to register and verify welding personnel.
- Renewal of a welder's qualification to weld a specified welding procedure shall remain valid, provided that it can be shown from records maintained by the organisation employing the welder that the welder has been employed with reasonable continuity using the relevant welding processes, and has continued to produce satisfactory welds as verified by the non-destructive examination, workmanship and pressure testing requirements of the relevant pressure equipment standard unless:
  - Six (6) months or more have elapsed since the welder was employed on the relevant welding processes.
  - There is some specific reason to question the welder's ability.
- A welder shall become qualified for an approved welding procedure in accordance with AS3992 - Clause 9.2.
- This includes an option, provided that CS Energy is satisfied, a welder whose qualification has lapsed may become re-qualified to the welding procedure by a successful, either radiographic or ultrasonic examination:
  - of the first production weld or
  - a completed test weld.

## 6.6 Destructive and Non-Destructive Testing

- All destructive and non-destructive testing shall be in accordance with the relevant equipment standards including AS 4037, AS1210, AS1228, AS4041, and any other CS Energy specific requirements such as relevant standard for weld qualification standards.
- All testing shall be carried out by qualified personnel.
- CS Energy's NDT requests shall be produced on CS Energy Forms S1587 or S1588.
- Contractors may use their system of NDT requests, if approved by the CS Energy site.
- Records of all NDT inspections shall be filed, in TRIM, with either the Weld Instruction or Contract specific reports i.e. overhauls. The NDT reports shall become part of the Manufactures Data Report.
- When required, references or copies of the NDT reports shall be kept with the Welder Qualification and performance records.

## 6.7 Contractors

Before commencing work, a contractor shall provide evidence of welder qualification records in accordance with this document.

- If required, a welder qualification test may be requested to meet the requirements of CS Energy.
- If contractors wish to use their own welding procedures, they shall require approval of CS Energy.
- In addition, Welder qualifications shall also be required to their proposed welding procedure.

Procedure No: CS-WELD-1002  
TRIM Ref No: B/D/08/3091  
Reviewed: 02/23  
Amended: 02/23  
Review Due: 02/25



- Records of these procedures shall be kept with the weld records in the appropriate files.

## 6.8 Quality Records

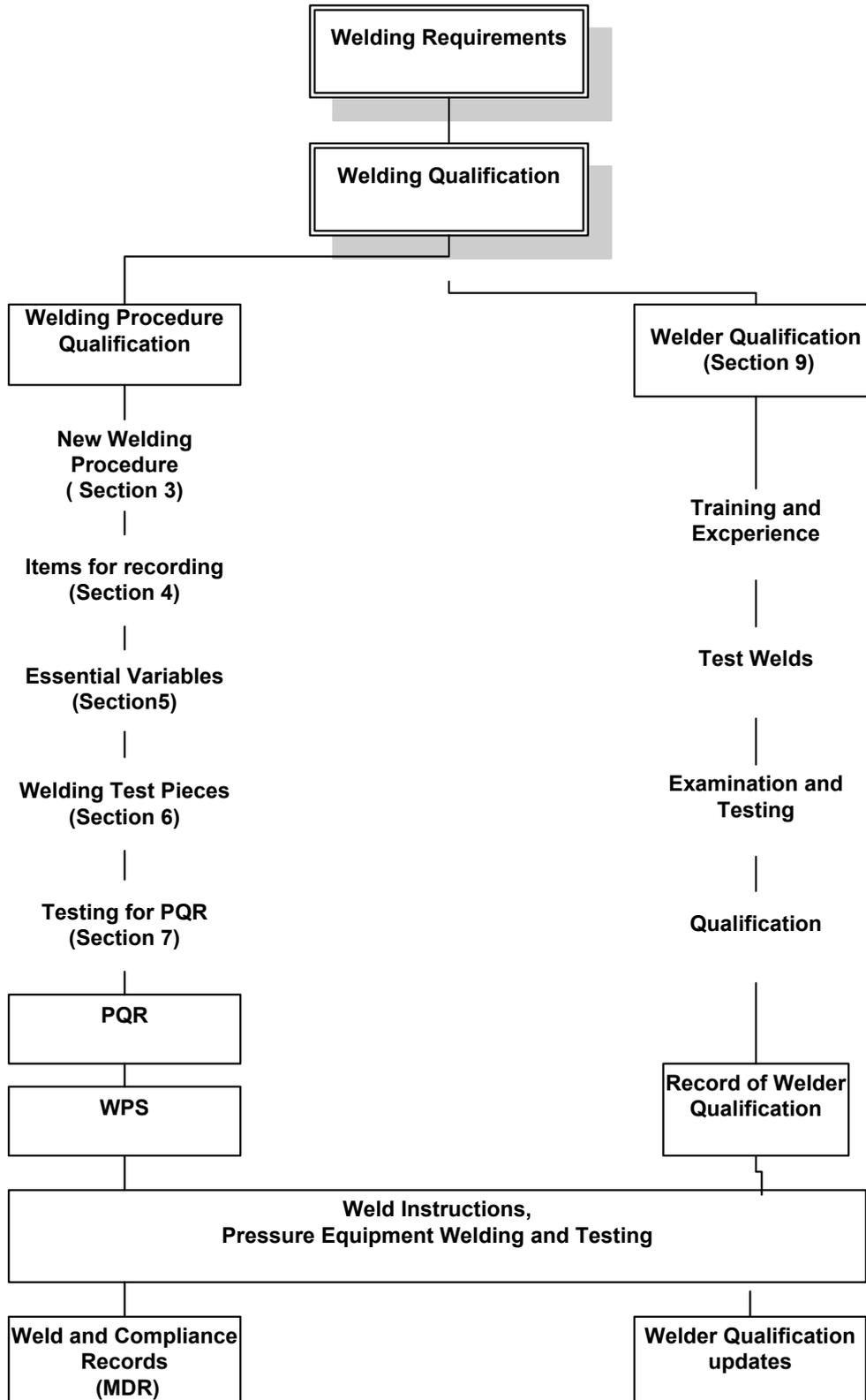
Quality records shall include when applicable to AS/NZS ISO 3834.1 - Attachment 1 - Criteria Which Assist in The Selection Quality, are the guidelines to be used when undertaking welding processes or pressure equipment manufacture.

Welding compliance records, including; weld Instructions, material certificates, Welder qualifications, NDT reports, heat treatment records, hydrostatic tests, weld traceability maps, field reports, etc.

These documents are usually titled Manufacturers Data Report (MDR).

## 7 PROCESS FLOW

The following process chart has been adapted from AS 3992 for CS Energy process for welding of pressure equipment; Reference AS3992 Figure 1.1.



## 8 REFERENCES

| Reference No                 | Reference Title   | Author         |
|------------------------------|---|----------------|
|                              | Workplace Health and Safety Act   | WHSQ           |
|                              | Workplace Health and Safety Code of Practice - Welding  | WHSQ           |
|                              | Workplace Health and Safety Regulations   | WHSQ           |
| AS 1228                      | Pressure equipment-Boilers  | Standard       |
| AS 1674.2                    | Safety in welding and allied processes – Electrical   | Standard       |
| AS 1796                      | Certification of Welders and Welding Supervisors  | Standard       |
| AS 4037                      | Pressure equipment - Examination and testing  | Standard       |
| AS 4041                      | Pressure Piping   | Standard       |
| AS 4458                      | Pressure equipment - Manufacture  | Standard       |
| AS 60974.1                   | Arc welding equipment – Welding power sources (Section 11 and 13 for hazard reducing devices) | Standard       |
| AS/NZS 1200                  | Pressure Equipment  | Standard       |
| AS/NZS 1210                  | Pressure Vessels  | Standard       |
| AS/NZS 3788                  | Pressure equipment - In-service Inspection  | Standard       |
| AS 3992                      | Pressure equipment - Welding and brazing qualification  | Standard       |
| AS/NZS/ISO 3834              | Quality requirements for fusion welding of metallic materials                                 | Standard       |
| ASME BPVC-IX                 | Welding, Brazing, and Fusing Qualifications   | Standard       |
| ISO 15607                    | Specification and qualification of welding procedures for metallic materials - General rules  | Standard       |
| ISO 9606-1                   | Qualification Testing of Welders for Fusion Welding of Steels                                 | Standard       |
|                              | Welding Electrical Safety – Technical Note 22   | Weld Australia |
|                              | Health and Safety in Welding – Technical Note 7   | Weld Australia |
| <a href="#">B/D/10/21968</a> | Welding Procedure Reference Master Spreadsheet  | CS Energy      |
| <a href="#">B/D/15/4331</a>  | Form - S1584 - Weld Procedure Specification (WPS)   | CS Energy      |
| <a href="#">B/D/13/19412</a> | Form - S1588 - Weld Instruction/Non Destructive Testing Request                               | CS Energy      |

## 9 RECORDS MANAGEMENT

In order to maintain continual improvement, suitability, safety and effectiveness of the organisation, registered documents will be reviewed on a two-yearly basis or at intervals specified by legislative or regulatory requirements. Review of registered documents should occur where it has been identified that there are changes in technology, legislation, standards, regulation or where experience identifies the need for alteration to the content. Registered documents should also be reviewed following an incident, change management process, modification or where directed as part of a risk assessment process. A 'review' can simply mean that it has been identified, confirmed and appropriately recorded that no changes are required and that the existing process remains the same.

Government Owned Corporations must ensure that records are retained according to accountability, legal, administrative, financial, commercial and operational requirements and expectations. In compliance with records retention and disposal, all documentation created in relation to business must be retained in line with minimum retention periods as detailed in legal retention and disposal schedules.

Procedure No: CS-WELD-1002  
 TRIM Ref No: B/D/08/3091  
 Reviewed: 02/23  
 Amended: 02/23  
 Review Due: 02/25



## 10 ATTACHMENTS

### 10.1 Attachment 1 – Selection Quality Criteria Assistance

A table has been extracted from AS/NZS ISO 3834.1 and modified to highlight where the elements of the quality system align with this procedure.

| No | Element                             | ISO 3834-2   | ISO 3834-2 Clause No | CS-WELD-1002 Procedure Reference   |
|----|-------------------------------------|--|----------------------|--|
| 1  | Review of requirements              | Review required  | Clause 5.2           | 4.4 - Weld Instructions  |
| 2  | Technical Review                    | Record required  | Clause 5.3           | 4.4 - Weld Instructions  |
| 3  | Sub-contracting                     | Treat like a manufacturer for the specific subcontracted product, services and/or activities, however final responsibility for quality remains with the manufacturer | Clause 6             | 4.7 - Contractors.<br>A Contractor performing welding activities shall conform to the requirements of this procedure.  |
| 4  | Welders and welding Operators       | Qualifications are required  | Clause 7.2           | 4.5 - Welder Qualification   |
| 5  | Welding Co-ordination personnel     | Required   | Clause 7.3           | The manufacturer shall have at his disposal appropriate welding coordination personnel. Such persons having responsibility for quality activities shall have authority to enable any necessary action to be taken. |
| 6  | Inspection and testing personnel    | Qualification is required  | Clause 8             | 4.6 - Destructive and Non-Destructive Testing  |
| 7  | Production and testing Equipment    | Suitable and available as required for preparation, process execution, testing, transport, lifting in combination with safety equipment and protective clothes       | Clause 9.1           |  |
| 8  | Equipment Maintenance               | required to provide, maintain and achieve product conformity. Documented plans and records are required.   | Clause 9.5           | 3 - Health and Safety and also;<br>KA-PAS-20-EQ03.<br>CB-PAS-20-EQ05.  |
| 9  | Description of Equipment            | List is required   | Clause 9.2           | Usually listed in equipment registers for CS Energy and Contractors, not specifically listed in this procedure.  |
| 10 | Production Plans                    | Document plans and records are required  | Clause 10.1          | 4.4 - Weld Instructions  |
| 11 | Welding Procedure Specifications    | Required   | Clause 10.2          | 4.3 – Welding procedure Specifications (WPS)   |
| 12 | Qualification of welding procedures | Required   | Clause 10.3          | 4.2 - Welding Procedure Qualification Records (PQR)  |
| 13 | Batch testing of consumables        | If required  | Clause 11.2          | Not specifically called for in this procedure, but may be included in the technical review whilst creating the Weld Instruction.   |

Procedure No: CS-WELD-1002  
 TRIM Ref No: B/D/08/3091  
 Reviewed: 02/23  
 Amended: 02/23  
 Review Due: 02/25



| No | Element  | ISO 3834-2   | ISO 3834-2 Clause No | CS-WELD-1002 Procedure Reference   |
|----|--|--|----------------------|--|
| 14 | Storage and handling of welding consumables  | Procedure required in accordance with suppliers recommendations  | Clause 11.3          | A procedure to be written,   |
| 15 | Storage of Parent Materials  | Protection required from influence by environment, identification shall e maintained through storage   | Clause 12            |  |
| 16 | Post Weld Heat Treatment   | confirmation that the requirements according to product standard or specifications are fulfilled. procedure, record and traceability of the record to the product are required | Clause 13            |  |
| 17 | Inspection and testing, before, during & after welding and post weld heat treatment. | Required   | Clause 14            | Requirements to be identified in 4.4 - Weld Instructions                                   |
| 18 | Non-conformance and corrective actions   | Measures of control are implemented. Procedures for repair and/or rectification are required   | Clause 15            | Non-conformances shall follow the CS Energy's, Incident Investigation Standard - CS-IM-04. |
| 19 | Calibration or validation of measuring, inspection and testing equipment.            | Required   | Clause 16            |  |
| 20 | Identification during process  | If required  | Clause 17            |  |
| 21 | Traceability   | If required  | Clause 17            |  |
| 22 | Quality Records  | Required   | Clause 18            |  |