

TRADE OF  
**Pipefitting**

PHASE 2

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Module 5

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Technical Drawing

UNIT: 5

**Traceability Record**

*Produced by*

**SOLAS**

**An tSeirbhís Oideachais Leanúnaigh agus Scileanna**  
Further Education and Training Authority

*In cooperation with subject matter expert:*

Finbar Smith

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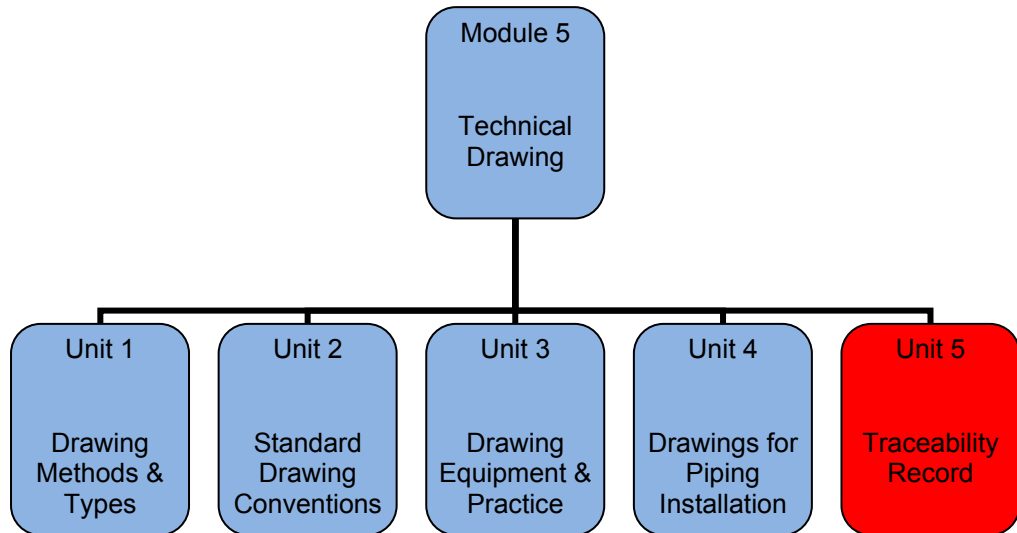
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## Unit Objective

There are five units in Module 5. Unit 1 focuses on Drawing Methods & Types, Unit 2; Standard Drawing Conventions, Unit 3; Drawing Equipment & Practice, Unit 4; Drawings for Piping Installation, Unit 5; Traceability Record.

In this unit you will be introduced to welding traceability records.



## Learning Outcome

By the end of this unit each apprentice will be able to:

- Recognize the requirement for independent inspection and testing of high purity welds
- Complete the project header details on the sample weld record sheet
- Complete the weld information in columns 1 to 8 on the sample weld record sheet
- Complete the material information in columns 9 to 12 on the sample weld record sheet

# 1.0 Traceability of Weld Records

## Key Learning Points

- Identify the need for weld traceability
- Identify other weld qualification documents required

## 1.1 Requirement for Weld Traceability

Pharmaceutical manufacturing companies are regulated by bodies such as the Irish Medicines Board (IMB), the EU Pharmacopoeia and/or the Food and Drug Administration (FDA) in the US. These regulatory bodies require that any pharmaceutical company manufacturing drugs for consumption in their regulatory area must conform to certain quality standards. These standards include the construction of the pharmaceutical manufacturing plant and for these reasons weld isometric maps and weld record sheets must be maintained. These records list weld information such as a unique number for each weld, the welder who welded it and the type of inspection and the date it was carried out. The weld number and the welder's identification number is also recorded on the pipe beside the actual weld. Other information such as the serial numbers of the weld head and power supply may be entered into some orbital welding plants and printed out along with the weld programme which identifies the parameters of the welding sequence, these are then filed with the weld coupons to form part of the overall welding handover package.

These weld records are combined with the Material Test Reports (MTRs or materials certificates) which list the chemical composition and test data of the heats of materials used. Surface finish test reports, and results of pressure testing, passivation, and other documentation required by the Design Specification must be presented to and retained by the owner/user for a required period of time.

## 1.2 Other Types of Weld Qualifications

Other specific welding qualifications / documentation that are required by pharmaceutical companies are:

- Weld Procedures (WP) which document the exact parameters / settings required to complete a particular size weld
- Welder Qualifications (WQ), evidence that a welder has completed a weld in accordance with a particular weld procedure and that it has been tested and deemed acceptable.
- Weld coupon log records the details of all the weld coupons welded and inspected. It is recommended that a weld coupon is completed, and then cut open and inspected at the start and end of each shift and if any major change of welding parameter has been made, such as change in size or change in purge gas supply. This is to ensure that the settings of the welding plant are producing acceptable welds.

## 2.0 Weld record Sheets

### Key Learning Points

- Identify the main sections of a weld record sheet
- Identify the component parts of each section in the weld record sheet
- Be able to identify the information required to complete a weld record sheet.

### 2.1 Weld Record Sheet Information

A weld record sheet is used to track the critical information for each specific weld completed in a piping system. Figure 1 below illustrates a typical weld record sheet which is sub divided into 4 main sections these being:

- Header section
- Weld information section
- Material information section
- Test information section

The weld record sheet is used in conjunction with the weld isometric drawing and is often printed on the back of the drawing or attached to the drawing. Where possible the design office should fill in the common information before printing to increase efficiencies and minimise the risk of error. The pipe fitter can fill out the material information section as the spool is being tacked together. The welder then generally fills out the weld information section and the weld inspector completes the final test information section.

Once complete the project engineer reviews it and verifies that all welds are completed, tested and accepted it can then be signed approved and included in the overall handover documentation package.

Client : \_\_\_\_\_ FAS Project No.: \_\_\_\_\_ System: \_\_\_\_\_  
 Client Project No.: \_\_\_\_\_ Machine Serial No.: \_\_\_\_\_ Line / Iso. No. : \_\_\_\_\_  
 Approved By : \_\_\_\_\_ Machine Model No.: \_\_\_\_\_ Sheet : \_\_\_\_\_ of \_\_\_\_\_

Weld Information								Material Information					Test Information				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Weld No.	Welders No.	Weld Size	Weld Date	Location	Shop	F.W.	Auto	Man.	Component/	Component	Cast No./	Cast No.	NDT Report No.	NDT Type	NDT Date	Accept or Reject	Inspectors Initials
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	

Figure 1 – Typical weld record sheet



## 2.2 Header Section

**Client:** The company name who the work is being completed for.

**Client project No.:** A unique number assigned by the client for the work being completed.

**Approved by:** Signature of the person approving the weld record sheet

**Project No.:** A unique number assigned by the contractor for the work being completed. It is usually used to track costs and progress on a particular project.

**Machine Serial No.:** The serial number of the welding machine used to carry out the welding. It is unique to each machine and if faults are discovered and linked back to this machine, it makes it easier for all welds completed by this machine to be tracked and re-inspected after the fact.

**Machine model No.:** The type of model of welding machine used to complete the welding.

**System:** The name of the system being welded, e.g. Pure steam, product etc..

**Line/Iso. No.:** This is the isometric drawing number or the line number for which the welds that are being recorded are on.

**Sheet No.:** Sometimes there may be 3 or 4 isometrics for one line therefore they are grouped together as sheet 1 of 5, 2 of 5 etc.

## 2.3 Weld Information Section

**Weld No.:** Unique number given to each weld in sequence so that there is complete traceability for every weld in the system

**Welder No.:** Unique number given to every welder in a company. This number is recorded on the Welder qualification record after a welder performs and passes their qualification tests. This number is then recorded for every weld completed on both the weld record sheet and marked on the pipe beside each weld completed.

**Weld Size:** Size of the weld being completed. This is used to tie back to weld coupon log to ensure that only these size welds were completed once the correct size weld coupons were completed.

**Weld date:** The date the weld was completed.

**Location:** Where the weld was completed, i.e. in the workshop or out on site. Shop welds are usually much easier as they are completed on a bench with good access and minimum purging, while field welds are usually more difficult as access is usually more difficult and the complete system needs to be purged which is harder to achieve. In critical systems a reduced percentage of shop welds may be inspected while the client may insist that 100% of all field welds are inspected.

**Process:** Automatic or manual, most welds should be automatic which are more consistent and therefore more likely to pass inspection. Manual welds are only used where the fitting to fitting distance is reduced to a point where the automatic weld heads will not fit and therefore a manual weld is required. These are only usually allowed by prior approval of the client and usually require 100% inspection.

## 2.4 Material Information Section

**Component / Component:** This identifies the different components either side of a weld, e.g. Pipe/elbow or elbow/tee etc..

**Cast No. / Cast No.:** Also known as the heat number it identifies the batch of material that the component was manufactured from. It was once a requirement that the cast number had to be the same each side of the weld to ensure consistent welding, however due to improved manufacturing techniques it is now possible for mills to repeatedly produce material which is consistent and which has tightly tolerated ingredient amounts. This consistency in the materials of the components ensures that the finished welds are of a high quality.

## 2.5 Testing Information Section

**NDT Report No.:** Non Destructive Test report No., this allows the weld record sheet to be cross referenced to the independent test report.

**NDT type:** Usually boroscope (optic fibre with a camera on the end that is pushed down the tube and rotated to record the internal profile of each weld. The boroscope is non hazardous, quick, can be carried out during normal working hours and gives instant feedback and there is generally used for 90% of the welds on a system. The other option is to X-ray the weld to get a radiographic picture of the weld, this is usually done on closing welds where it is not possible to gain access for the boroscope. X-rays are usually done at night out of hours to reduce the risk of exposure to radiation sources and the films have to be developed therefore the results are slower.

**NDT date:** The date the weld was inspected.

**Accept or Reject:** The result of the NDT inspection. See Phase 4, module 2 Unit 8 for accept / reject criteria.

**Inspector initials:** Proof from the welding inspector that each of the individual welds was inspected and that the result is valid.

## Exercises

- Complete the sample weld record sheet provided.

## Additional Resources

Title	Author	Ref. Code
The Induction Book, “ <i>Code of Behaviour &amp; Health &amp; Safety Guidelines</i> ”	SOLAS	
Basic Welding and Fabrication	W Kenyon	ISBN 0-582-00536-L
Fundamentals of Fabrication and Welding Engineering	FJM Smith	ISBN 0-582-09799-1
<i>Workshop processes, practices and materials</i> , 3 <sup>rd</sup> edition, Elsevier Science & Technology	Black, Bruce J 2004	ISBN-13: 9780750660730
New Engineering Technology	Lawrence Smyth & Liam Hennessy	ISBN 086 1674480

### Videos:

- Understanding welding fumes
- Welder on Site...Be Aware (Vocam)
- Powered hand tool safety (Vocam)
- Industrial Ergonomics (Vocam)

Available from:

***Vocam Ireland***

***Circle Organisation Ltd***

***Friar Street, Thurles, Co Tipperary, Ireland***

***Tel: +353 504 24666***

S O L A S

An tSeirbhís Oideachais Leanúnaigh agus Scileanna  
Further Education and Training Authority

*Castleforbes House  
Castleforbes Road  
Dublin 1*