Approval

Approving Authority	*Name*	*Signature*	*Date*
President	Joseph Parisi		3/28/14
Operations Manager	Steve Hansen		3/28/14
V.P. Engineering	Steve Rusconi	Steve Rusconi	3/26/14
Process Systems Manager	Michael Delgado		3/25/14
Quality Assurance Manager	Steve Washington		3/24/14

Revision History

Revision #	*Description of Change*	*Effective Date*	*DCR#*
5	-	-	00017
6	Data Modifications	-	02011
7	Data Modifications	5/04/07	07009
8	Data Modifications	3/09/12	10006
9	Add Revision History, Revise Header	03/28/14	13012

1 Purpose

1.1 To establish a standard drawing format for documenting the fabrication by welding of pharmaceutical and high purity process piping.

2 Scope

2.1 This procedure applies to high-purity stainless steel and higher alloys and tool hookup assemblies.

3 Responsibilities

3.1 The Therma General Foreman (GF) shall request a lead Fabrication Detailer (FD) from the detailing department supervisor.

3.2 The detailing department supervisor shall assign the lead FD to the GF for the project.

3.3 The lead FD shall train and manage all other detailers to guarantee conformance to the procedures listed below.

4 Procedures

4.1 Obtain a completed copy of the approved coordination (orthographic) drawings, Piping & Instrumentation Diagrams (P&IDs), equipment shop drawings/submittals and instrumentation submittals.

4.2 Create a piping 'spool' drawing for every prefabricated assembly. Review the orthographic drawing with the field and prefab foremen to establish prefabrication lines of demarcation.

4.2.1 Use SOP Form FN5.002.1 Process Systems Spool Title Block drawing.

4.2.2 Refer to Figure No.1 sample with notes.

4.3 Drawing shall be "B" size (11" X 17").

4.4 Draw spool assembly in single-line fashion (except where CAD modeled drawings auto generate specific three-dimensional items). Items to be indicated on sketch must include the following:

4.4.1 Piping (tubing), fittings, valves and welded joints including orientation.

4.4.2 Weld ID balloons, not labeled (to be filled in by welder under SOP 5.005 (Automatic GTAW Welds)

4.4.3 Valve P&ID Tags

4.4.4 Flow Direction Arrows

4.4.5 Slope arrows and pitch

4.4.6 Pipe lengths/centerlines and dimensional notes

4.4.7 Line designation or Line Numbers

4.4.8 Instrumentation with P&ID Tags and orientation noted

4.4.9 Drawings which are connected to this assembly or continuation notes.

4.4.10 Insulation, including thickness (and type if applicable)

4.4.11 Dimensional reference to column lines or equipment centerlines if applicable

4.4.12 Orientation identifier, this should be accomplished by a north arrow pointed to the upper left corner if feasible

4.4.13 Bill of Materials - See section 4.7.

4.5 The spool drawing title block must include the following:

4.5.1 Drawing Revision History

4.5.1.1 Revision Number

4.5.1.2 Revision Date (format: MM/DD/YY or DDMMMYY)

4.5.1.3 Designer's Initials

4.5.1.4 Drawing Revision Description (e.g. Issued for Approval, Issued for Prefab, etc)

4.5.2 Specifications (e.g. customer's design specification section #)

4.5.3 Pipe/Tube Specification

4.5.3.1 Material Spec. & Grade (e.g.: ASTM A-270 Gr. 316L)

4.5.3.2 Surface Finish Spec. (e.g.: ASME BPE SF4, 15 Ra + EP)

4.5.4 Fittings Specification (e.g. ASME BPE SF4)

4.5.4.1 Material Spec. & Grade (e.g.: ASTM A-479/ASME SA-479 Gr. 316L)

4.5.4.2 Surface Finish Spec. (e.g.: ASME BPE SF1, 20 Ra)

4.5.5 Flanges Specification (e.g. Hygienic Clamp Joint(HCJ) AKA: Sanitary Tri-Clamp or Tri-Clover)

4.5.6 Approvals Signature and Date by Designer and Client

4.5.7 Therma's Logo, Address and Copyright statement

4.5.8 Job Name

4.5.9 Utility System Name (e.g. WFI, Clean Steam, etc)

4.5.10 Line Number (e.g. 2"-PS-316L-SS)

4.5.11 Date (e.g. date which electronic drawing file started)

4.5.12 P&ID Reference (e.g. PID 6.15)

4.5.13 Ortho Graphic Reference (e.g. HP210_PS)

4.5.14 Job # (e.g.: current project/job number)

4.5.15 Base # (e.g.: Original project tracking #/job number)

4.5.16 Drawing Number

4.5.17 Sheet Color Code

4.5.17.1 Blue = Validated systems requiring welding and examination log Form FN5.005.5 GTAW Weld Log.

4.5.17.2 White= non-validated, no logs required

4.5.18 Slope specification (e.g.: 1/8" per foot)

4.5.19 Weld Count: Total number of welds on the sheet

4.5.20 Insulation thickness

4.6 Drawing number. The format shall be as follows:

4.6.1 The first part of the drawing number shall be indicated with system classification that is marked on design drawing (e.g. P&IDs).

4.6.2 If the P&IDs are completed with line serial numbers, the second part of the drawing number shall be the line serial number.

4.6.3 The third part of the drawing number shall be numeric drawing serial number. The numeric drawing serial number should start with the first spool sheet that made where the flow of liquid originates. Subsequent sheets follow and are numbered in order.

For Example: P-6051-002 is the second sheet of the product line 6051.

4.6.4 Where flows can be bi-directional, the first sheet should be originating at the transfer panel.

4.6.5 If a bi-directional line is a panel-to-panel, or tank-to-tank, begin with the equipment of the lowest number.

4.7 The materials schedule (e.g. Bill of Materials) shall show on the drawing. It shall include the following information:

4.7.1 Mark Item

4.7.2 Quantities

4.7.3 Size

4.7.4 Component Description – including applicable ASME BPE DT# for fittings.

4.7.5 Length

4.7.6 Tag Number (if any)

4.7.7 Any project and/or spool specific notes required for the drawing.

4.8 Upon completion of all weld map drawings, a master log and/or Spool Map diagram shall be assembled to assist drawing reviewers as required per project specifications.

4.8.1 A spool map shows multiple spools in a system to provide and overall or 'big picture' view or the piping.

4.8.2 Spool maps are typically drawn expanded or exploded with dashed lines indicating continuations between spool drawings.

4.8.3 Spool maps shall include labels for each spool shown which correspond to each spool drawing number.

4.8.4 Spool map drawing shall include Point-of-Connection(POC) information where piping connects with equipment, exisitng piping or adjacent spool maps.

4.9 Submit the isometric drawings for approval if required.

4.10 After receiving the approved isometric drawings, update the isometric drawing with newer revision and indicate “Issued for Prefab”. Send the approved isometric drawings back to project manager for his/her record.

4.10.1 Drawing revisions shall follow alphabetical sequence (e.g.: A, B, C...) until approved. Once approved, revisions hsall follow numeric sequence (e.g.: 1, 2, 3...).

4.11 Make a copy of the issued for prefab isometric drawing onto blue colored paper to become blue isometric drawing. The back side of the blue isometric drawing shall print with Orbital Weld Log (FN 5.005.5) for welder and Quality Control Examiner (QCE) use.

4.12 Send the blue isometric drawings to prefab manager who will communicate with field foreman about the estimated completion date and delivery date of the spool pieces.

4.13 After completion of welding by prefab welder and weld examination by Quality Control Examiner (QCE), QCE shall make a copy of the blue isometric drawing (front side is the completed welding and back side is to record orbital weld information) and save for QCE’s record use.

4.14 When the spool piece has been installed in the field, or on a process equipment skid, the QCE is to verify supports and slope then note on drawing per SOP 7.034. Then return the blue isometric drawing to the

project manager who will submit the blue isometric drawing to customer as part of turnover package documents.

4.15 Project manager is to provide copies of blue isometric drawing to lead fabrication detailer (FD) as needed for revision of CAD files to "as-built".

5 Review and Approval

5.1.1 No approval is necessary.

Figure No. 1: Standard Title Block for Spool Drawings (Form FN5.002.1)