

KLM Technology Group Project Engineering Standard	 www.klmtechgroup.com	Page : 1 of 13
		Rev: 01
		April 2011
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	Welding Qualification Test Procedure (PROJECT STANDARDS AND SPECIFICATIONS)	

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
1.0	PURPOSE	2
2.0	SCOPE	2
3.0	REFERENCES	2
4.0	DEFINITIONS	2
5.0	PROCEDURE	3
	5.1 WPS Preparation	3
	5.2 Step in Conduction WPQT	3
	5.3 Retest	7
6.0	SPECIAL REQUIREMENTS	8
7.0	RECORD	8
	Attachment	
	Appendix I : Welding Procedure specification	
	Appendix II : Welding Procedure Qualification Test Record	

KLM Technology Group Project Engineering Standard	 www.klmtechgroup.com	Page : 2 of 13
		Rev: 01
		April 2011
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	Welding Qualification Test Procedure (PROJECT STANDARDS AND SPECIFICATIONS)	

1.0 PURPOSE

This purpose of this procedure is to provide guidelines for qualifying WPS (welding procedure specification) required in the fabrication of structures.

2.0 SCOPE

This procedure shall be applied for welding procedure qualification test on all WPSs established in the fabrication of structures, process pipeworks, pressure vessels and related works

3.0 REFERENCES

- ANSI B31.3 (Latest Edition) : Chemical Plant and Petroleum Refinery Piping
ASME IX (Latest Edition) : Welding and Brazing Qualification
AWS D1.1 (Latest Edition) : Structural Welding Code

4.0 DEFINITIONS

- RT - Radiographic Testing
UT - Ultrasonic Testing
WPS - Welding Procedure specification
MPI - Magnetic Particle Inspection
NDT - Non Destructive Testing
PQR - Procedure Qualification Record
WPQT - Welding Procedure Qualification Test

KLM Technology Group Project Engineering Standard	 www.klmtechgroup.com	Page : 3 of 13
		Rev: 01
		April 2011
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	Welding Qualification Test Procedure (PROJECT STANDARDS AND SPECIFICATIONS)	

5.0 PROCEDURE

5.1 WPS PREPARATION

- 5.1.1 CONTRACTOR's Welding Engineer shall identify and submit to Company the list of relevant WPS to be used for the project from the pre-accepted WPS. If additional WPS is required, additional WPS shall be developed and submitted for the Companies approval before WPQT.
- 5.1.2 The Welding Engineer shall formulate the welding procedures to the joint configuration and application. The WPS shall be prepared as per the latest edition of AWS D1.1 for structural and ASME IX / ANSI 31.3 for piping (see Appendix I for the WPS format).
- 5.1.3 The proposed WPS shall contain all the essential, non-essential, and when required, supplementary essential variables for each welding process used in the WPS whichever are applicable as per Appendix I.
- 5.1.4 Upon approval of the WPS, a WPQT shall be carried out in the presence of Company representative. Company representative shall be informed 48 hours in advance prior to the testing.

5.2 STEPS IN CONDUCTING WPQT

- 5.2.1 Prior to the commencement of WPQT, the following shall be verified by Companies representative and CONTRACTOR's Welding Engineer.
- a) Test material (s) and electrodes used, including the heat number.
 - b) Dimensions of the test material (s) e.g. length, diameter, thickness etc.
 - c) Edge preparation of the test material (s).
 - d) Safety provisions are available and the test site protected from draughts.

KLM Technology Group Project Engineering Standard	 www.klmtechgroup.com	Page : 4 of 13
		Rev: 01
		April 2011
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	Welding Qualification Test Procedure (PROJECT STANDARDS AND SPECIFICATIONS)	

- e) Adequacy of lighting for cleaning and visual inspection.
- f) Copy of the proposed WPS is displayed for welder's reference.
- g) Welding machine including auxiliary equipment for use are calibrated and in good working conditions.
- h) Setting of current type, polarity including amperage and voltage.
- i) Correctness of welding consumables to be used as per proposed WPS.

- 5.2.2 Upon fit-up, weld preparation and alignment shall be checked for compliance to the proposed WPS. After fit-up inspection, mark the PQR number, test position and indicate the top of joint position (if pipe is used for the test).
- 5.2.3 The test piece shall be secured firmly per the required test position. Preheat the test piece properly by gas heating burners or other approved method to the required temperature specified in the proposed WPS. Check the preheat temperature with thermsticks or equivalent before allowing the welder to commence welding. The required preheat shall be achieved uniformly across the thickness of the test piece.
- 5.2.4 A trial test may be carried out on a separate specimen prior to welding on the testing piece to ensure the welding parameters set out in the WPS are maintained.
- 5.2.5 Monitor and record the following welding parameters in the PQR form (see Appendix II) on each pass until completion of test weld to ensure compliance within the ranges specified in the proposed WPS.
- a) Welding current i.e. amperage and voltage by mean of AC/DC Digital Clamp Meter (tong tester).
 - b) Travel speed / Wire feed speed.
 - c) Direction of travel for vertical welding.

KLM Technology Group Project Engineering Standard	 www.klmtechgroup.com	Page : 5 of 13
		Rev: 01
		April 2011
KLM Technology Group #03-12 Block Aronia, Jalan Sri Perkasa 2 Taman Tampoi Utama 81200 Johor Bahru Malaysia	Welding Qualification Test Procedure (PROJECT STANDARDS AND SPECIFICATIONS)	

- d) Use of specified welding consumables diameter, gas flow rate, electrode stick out length.
 - e) Welding technique i.e. string, weave, split layer.
 - f) Interpass temperature by use of or Thermosticks Digital thermometer.
 - g) Approximate width of weld pass
 - h) Approximate thickness of weld layer.
 - i) Interpass cleaning method.
 - j) Sequence and number of weld passes per layer.
 - k) Treatment to back side (backgouged, ground, backwelded, inspection etc.)
- 5.2.6 Upon completion of welding, visual inspection shall be carried out in accordance with AWS D1.1 or ANSI B 31.3 / ASME IX whichever is applicable.
- 5.2.7 Upon verification and acceptance of the recorded welding parameters in the PQR form followed by visual acceptance of test weld, the CONTRACTOR's Welding Engineer shall arrange for the required NDT in accordance with PTS 20.104 or PTS 20.112. No non-destructive testing (RT, UT & MPI) on mild steel should be carried out less than 24 hours after welding has been completed. For high strength steel and other materials i.e. stainless steel, duplex SS, copper nickel, the time delay should be minimum 48 hours.
- 5.2.8 NDT result shall be verified by Company representative prior to any further testing. For acceptable test weld, it shall be subjected to destructive testing.
- 5.2.9 CONTRACTOR's Welding Engineer shall proceed to mark the locations of test specimens on the welded test piece for each type of destructive test before cutting at site or direct dispatch to a Company