

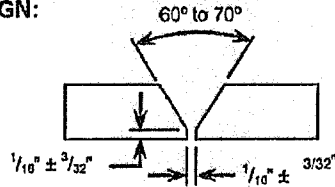
OLD

WELDING PROCEDURE DATA SHEET KXL-SMAW-ML



Revised 10 Feb 2011

PROJECT: Keystone Pipeline Project Phase 3 & 4 **SERVICE TEMPERATURE:** 23 °F
APPLICATION: Below Ground Pipe to Pipe Girth Welds & Tie Ins
MATERIAL SPECIFICATION(S): TES-PIPE-EW-US, TES-PIPE-SAW-US, API 5L X70M
DIAMETER GROUP: < 2 3/8 in. 2 3/8 in. through 12 3/4 in. > 12 3/4 in.
WALL THICKNESS GROUP: < 3/16 in. 3/16 in. through 3/4 in. > 3/4 in.
JOINT DESIGN:



Number of beads will vary with pipe wall thickness.

WELDING PROCESS(ES): SMAW (i.e. SMAW, GTAW, SAW, FCAW) **TYPE(S):** Manual (i.e. Manual, Machine, Automatic, Semi-Auto.)
FILLER METAL GROUP(S): 1,2 **ELECTRODES:** E6010, E8010 (G or P1)
ELECTRICAL CHARACTERISTICS: DCRP **POSITION:** 5G
WELDING DIRECTION: Vertical Down **SPEED OF TRAVEL:** 5-19 in./min.
SHIELDING GAS (Type, Mixture): Not Applicable **FLOW RATE:** Not Applicable
FLAME CHARACTERISTICS: Not Applicable **SHIELDING FLUX:** Not Applicable
LINE-UP CLAMP: External - Tie-in **REMOVAL OF CLAMP:** After 50% of root completed
PREHEAT TEMP.: 254°F min. **INTERPASS TEMP.:** 275°F min. / 425°F max. **PWHT:** None
TIME BETWEEN PASSES: Max. 15 min. between Root/Hot Pass, complete weld within 72 hrs
CLEANING and/or GRINDING: Wire brush and/or grinding as required.

Bead	Electrode		Welding Direction	Amperage Range	Voltage Range	Travel Speed Range, in./min.	Time Between Passes	Heat Input kJ/in.
	Size	Class						
Root	5/32	E6010	Down	108-171	19-27	10.8-16.5	15 min	9.0-19.1
Hot Pass	5/32	E8010G/P1	Down	149-216	20.7-32	14.5-18.7	30 min	12.0-23.2
Fill/Strip	3/16	E8010G/P1	Down	140-220	20.7-32	5.1-12.4	72 Hours	20.0-64.4
Cap	3-16	E8010G/P1	Down	126-198	22.5-34	8.6-16.2	72 Hours	12.8-44.7

REMARKS:

1. NDT - 100% radiography in accordance with the requirements of the current edition of API 1104.
2. Minimum preheat shall be maintained at all times, unless welding is interrupted in which case the joint must be preheated before welding re-commences.
3. If necessary due to WT changes or variation in joint spacing within the tolerance limits, it is permissible to change the electrode size to one nominal size smaller or larger, but the same range of welding parameters must be used.
4. Refer to Keystone Pipeline Specification TES-WELD-PL-US

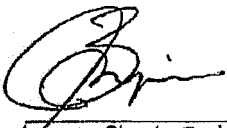

DECLARATION: The information in this data sheet is correct and based on welding procedure specifications that meet the qualification requirements of the latest edition of API 1104.

PQR KPL-RMS-SMAW-ML-Rev2

RECORDS:

Proposed by: Trent Bertholet Checked by: Jesse Bajnok

Contractor: Sunland Construction, Inc. Accepted by: BEN ATON

 18-FEB-2011
 Signature and Date
 7-JUN-2012
 Signature and Date

WELDING PROCEDURE DATA SHEET KXL-SMAW-PRP

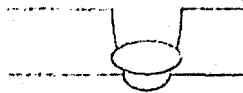


Revised 10 Feb 2011

PROJECT: Keystone Pipeline Project Phase 3 & 4 **SERVICE TEMPERATURE:** 23 °F
APPLICATION: Partial Thru-Wall Repairs on Pipe to Pipe Girth Welds
MATERIAL SPECIFICATION(S): TES-PIPE-EW-US, TES-PIPE-SAW-US, API 5L X70M
DIAMETER GROUP: < 2 3/4 in. 2 3/4 in. through 12 3/4 in. > 12 3/4 in.
WALL THICKNESS GROUP: < 3/16 in. 3/16 in. through 3/4 in. > 3/4 in.
JOINT DESIGN:



Original Weld Detail



Area Ground out to Remove Defects



Completed Repair

WELDING PROCESS(ES): SMAW (i.e. SMAW, GTAW, SAW, FCAW) **TYPE(S):** Manual (i.e. Manual, Machine, Automatic, Semi-Auto.)
FILLER METAL GROUP(S): 3 **ELECTRODES:** E8018-C3
ELECTRICAL CHARACTERISTICS: DCRP **POSITION:** 5G
WELDING DIRECTION: Vertical Up **SPEED OF TRAVEL:** 2.1 – 5.6 in./min.
SHIELDING GAS (Type, Mixture): Not Applicable **FLOW RATE:** Not Applicable
FLAME CHARACTERISTICS: Not Applicable **SHIELDING FLUX:** Not Applicable
LINE-UP CLAMP: Not Applicable **REMOVAL OF CLAMP:** Not applicable
PREHEAT TEMP.: 254°F min. **INTERPASS TEMP.:** 275°F min./425°F max. **PWHT:** None
TIME BETWEEN PASSES: Max. 15 min. between passes until completed
CLEANING and/or GRINDING: Wire brush and/or grinding as required.

Bead	Electrode		Welding Direction	Amperage Range	Voltage Range	Travel Speed Range, in./min.	Time Between Passes	Heat Input kJ/in.
	Size	Class						
Fill	3/32	E8018-C3	Up	80-135	19-27	2.1-3.2	15 min	28.5-68.5
Fill / Cap	1/8	E8018-C3	Up	110-160	19-26	3.1-5.6	15 min	22.4-80.5

REMARKS:

1. NDT - 100% radiography in accordance with the requirements of the current edition of API 1104.
2. Minimum preheat shall be maintained at all times, unless welding is interrupted in which case the joint must be preheated before welding re-commences.
3. Refer to Keystone Pipeline Specification TES-WELD-PL-US



DECLARATION: The information in this data sheet is correct and based on welding procedure specifications that meet the qualification requirements of the latest edition of API 1104.

PQR 916-AI

RECORDS:

Proposed by: Trent Bertholet Checked by: Jesse Bajnok

Contractor: Sumland Construction, Inc. Accepted by: BEN ATON

 18-FEB-2011
 Signature and Date
 7-JUN-2012
 Signature and Date

WELDING PROCEDURE DATA SHEET KXL-SMAW-RP



Revised May 9 2011 REVISION 1

PROJECT: Keystone Pipeline Project Phase 3 & 4 **SERVICE TEMPERATURE:** 23 °F
APPLICATION: Multiple Thru-Wall Repairs on Pipe to Pipe Girth Welds
MATERIAL SPECIFICATION(S): TES-PIPE-EW-US, TES-PIPE-SAW-US, API 5L X70M
DIAMETER GROUP: < 2 3/4 in. 2 3/4 in. through 12 3/4 in. > 12 3/4 in.
WALL THICKNESS GROUP: < 3/16 in. 3/16 in. through 3/4 in. > 3/4 in.
JOINT DESIGN:



Original Weld Detail



Area Ground out to Remove Defects



Completed Repair

WELDING PROCESS(ES): SMAW (i.e. SMAW, GTAW, SAW, FCAW) **TYPE(S):** Manual (i.e. Manual, Machine, Automatic, Semi-Auto.)
FILLER METAL GROUP(S): 1,3 **ELECTRODES:** E6010, E8018-C3
ELECTRICAL CHARACTERISTICS: DCRP **POSITION:** 5G
WELDING DIRECTION: See Table Below **SPEED OF TRAVEL:** 2 – 8 in./min.
SHIELDING GAS (Type, Mixture): Not Applicable **FLOW RATE:** Not Applicable
FLAME CHARACTERISTICS: Not Applicable **SHIELDING FLUX:** Not Applicable
LINE-UP CLAMP: Not Applicable **REMOVAL OF CLAMP:** Not applicable
PREHEAT TEMP.: 254°F min. **INTERPASS TEMP.:** 275°F min. / 425°F max. **PWHT:** None
TIME BETWEEN PASSES: Max. 15 min. between passes until completed
CLEANING and/or GRINDING: Wire brush and/or grinding as required.

Bead	Electrode		Welding Direction	Amperage Range	Voltage Range	Travel Speed Range, in./min.	Time Between Passes	Heat Input kJ/in.
	Size	Class						
Root	1/8	E6010	Down	60-120	21-35	3 - 7	15 min	11.8-90.0
Hot Pass	3/32	E8018-C3	Up	70-110	20-27	2 - 6	15 min	22.7-68.5
Fill/Strip	1/8	E8018-C3	Up	110-160	19-26	3 - 8	15 min	44.7-92.4
Cap	1/8	E8018-C3	Up	100-160	19-26	3 - 8	15 min	23.7-92.4

REMARKS:

1. NDT - 100% radiography in accordance with the requirements of the current edition of API 1104.
2. Minimum preheat shall be maintained at all times, unless welding is interrupted in which case the joint must be preheated before welding re-commences.
3. If necessary due to WT changes or variation in joint spacing within the tolerance limits, it is permissible to change the electrode size to one nominal size smaller or larger, but the same range of welding parameters must be used.
4. Refer to Keystone Pipeline Specification TES-WELD-PL-US

DECLARATION: The information in this data sheet is correct and based on welding procedure specifications that meet the qualification requirements of the latest edition of API 1104.

PQR 916-AI, 916-N

RECORDS:

Proposed by: Trent Bertholet Checked by: Jesse Bajnok

Contractor: Sunland Construction Inc. Accepted by: Bert Aron

Signature and Date 9-MAY-2011

Signature and Date 7-MAY-2012