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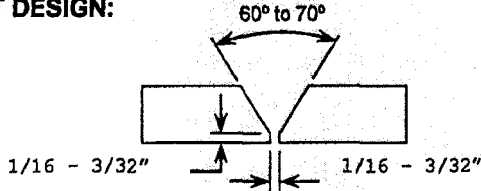
WELDING PROCEDURE DATA SHEET KXL-SMAW-ML



Revised January 31, 2013

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. [X] > 12 3/4 in.
WALL THICKNESS GROUP: [] < 3/16 in. [X] 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: External After 50% of root completed
Internal - Mainline Internal After 100% of root completed
PREHEAT TEMP.: 254°F min. INTERPASS TEMP.: 275°F min. /425°F max. PWHT: None
TIME BETWEEN PASSES: Maximum 15 min. between Root/Hot Pass, complete weld within 72 hrs
CLEANING and/or GRINDING: Initial Bevel Preparation: Mechanical End Face or Grinding and wire wheel on the ID. Cleaning Between Passes: Wire brush and/or grinding as required.

Table with 8 columns: Bead, Electrode Size, Electrode Class, Welding Direction, Amperage Range, Voltage Range, Travel Speed Range, Time Between Passes, Heat Input kJ/in. Rows include Root, Hot Pass, Fill/Strip, and Cap.

REMARKS:

- 1. NDT : 100% in accordance with the TransCanada Specification TES-WELD-PL-US
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 RECORDS: KPL-RMS-SMAW-ML-Rev2

Proposed by: Trent Bertholet

Checked by: Meera Kothari

Handwritten signature and date: 1/31/2013

Signature and Date
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