

PROCEDURE SPECIFICATION FOR: Austenitic stainless steel piping, insert welding, GTAW (root) and SMAW (weld-out), with optional GTAW cover pass.

BASE METAL: The base metal shall conform to the specifications for ASME, Section IX, P-8 materials.

FILLER METAL: The filler metal shall conform to ASME Filler Metal Specification Number SFA-5.9 for filler metal in Group Number F-6. The chemical composition of the weld deposit shall fall within the limits of Weld Metal Analysis Number A-8.

GAS FOR TORCH SHIELD: Nominal composition of argon, 99.995% minimum purity (for GTAW process).

GAS FOR BACK-UP PURGE: Argon per Page 7 (for GTAW process).

TACK WELDS FOR SET-UP: The GTAW process using filler metal type listed on Page 2 may be used with or without back-up purge in 1/16, 3/32, or 1/8" diameter. Test reports are on Pages 5 & 6.

POSITION: The welding may be done in all positions.

PREHEAT: None Required

POST HEAT TREATMENT: None

DACKING STRIP: None

INTERPASS: 350° maximum. (May be maintained by application of demineralized water between passes as a coolant).

WEAVING: Shall not exceed two electrode diameters or the inside diameter of the gas cup.

TRAVEL SPEED: GTAW 2"-6" per min
SMAW
3/32" = 1 1/2"-6" per min
1/8" = 1 1/2"-6" per min
5/32" = 2"-7" per min
3/16" = 2"-7" per min

WELDING PROCESS: The welding shall be done by the GTAW insert root and SMAW weldout processes using manual equipment. The GTAW process may be used with the filler metal type listed on Page 2 for intermittent voids, look-in holes (peep holes) in the ring, mismatch in the root, or optional cover pass. If necessary, one complete pass may be made while holding the purge. GTAW welding shall be done using a non-consumable electrode of 2% thoriated tungsten, EWTH-2.

BASE METAL THICKNESS: This procedure is qualified to allow welding of material thickness between 3/16" and 1.4".

PREPARATION OF BASE MATERIAL: The edges or surfaces of the parts to be joined by welding may be prepared by plasma arc, grinding, machining, or any combination of methods to essentially form the geometry of the weld shown on Page 2 and detailed on the attached sketches and shall be cleaned of all oil or grease and excessive amounts of scale or rust.

ELECTRICAL CHARACTERISTICS: The current used shall be DC GTAW-Straight Polarity
SMAW-Reverse Polarity

JOINT WELDING PROCEDURE: The welding techniques such as electrode sizes, and voltages and currents for each electrode, size of the welding tip and filler rods, shall be substantially as shown on Page 2.

APPEARANCE OF WELDING LAYERS: The welding current and manner of depositing the weld metal shall be such that there shall be practically no undercutting on the side walls of the welding groove or the adjoining base material. See job specifications for specific undercutting limitations.

CLEANING: All slag or flux remaining on any bead of welding shall be removed before laying down the next successive bead of welding.

DEFECTS: Any cracks or blow holes that appear on the surface of any bead of welding shall be removed by chipping or grinding before depositing the next successive bead of welding.

THIS PROCEDURE IS A QUALITY OF WELDING
15/16:

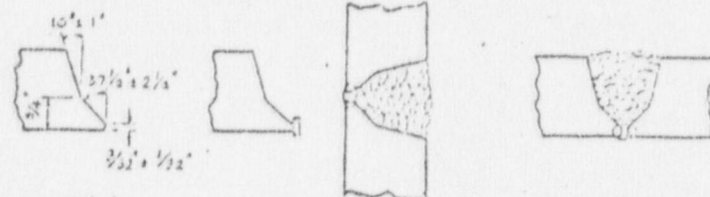
Code No. 15, P8-K1-F5-SMAW-2G-5G
16, P8-K1-F5-SMAW-2G-5G

JOINT DETAILS AND WELDING TECHNIQUES

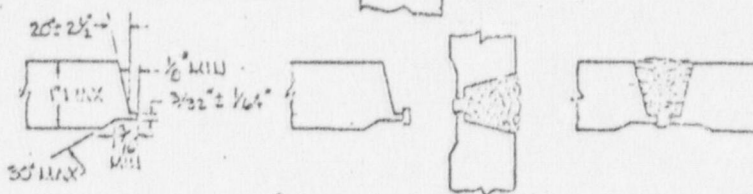
3/4" AND UNDER
WALL THICKNESS



OVER 3/4" WALL
THICKNESS



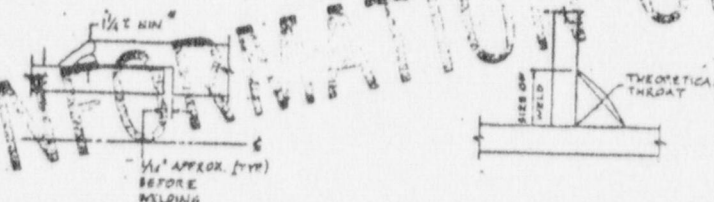
1" AND UNDER
WALL THICKNESS



OVER 1" WALL
THICKNESS



FOR SOCKETS AND
FILLETS



FOR INFORMATION ONLY

PASS NO. AND PROCESS	FILLER METAL TYPE OPTIONAL	FILLER METAL SIZE OPTIONAL	AMPS	VOLT RANGE	POLARITY	TORCH SHIELD & FLO RATE (MIN.)	TUNGSTEN SIZE AND POLARITY
TACK	ER 308	1/16 3/32 1/8	45-120 70-150 100-190	13-26	Straight	Argon 20 CFH	1/8 or 3/32 diameter straight
GTAW							
ROOT	ER 308	Insert 1/8 X 3/32 1/8 X 5/32	45-140	13-26	Straight	Argon 20 CFH	1/8 or 3/32 diameter straight
GTAW							
BALANCE SHAW	E 308	3/32 1/8 5/32 3/16	45-80 70-110 90-140 130-180	13-26	Reverse	—	—
OPTIONAL COVER PASS GTAW	ER308	1/16 3/32 1/8	45-120 70-150 100-190	13-26	STRAIGHT	ARGON 20 CFH	1/8 or 3/32 diameter straight

NOTE: 1/16", 3/32", or 1/8" ER 308 filler metal may be used as necessary for tacking, filling intermittent voids, look-in holes (peep holes), or mismatch in the root set-up. If necessary, one complete pass may be made while holding the purge.

For fillets and socket welds, delete the insert and root passes and follow with the balance of passes.

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

8/31/77

Specification No. P8-K1-F5-SMAW-2G Date 3/28/68 Rev. Date 2/19/70 and 6/11/71
 Welding Process GTAW & SMAW Manual or Machine Manual
 Material Specification A312 T304 to A312 T304 P-No. 8 to P-No. 8
 Thickness (if pipe, diameter and wall thickness) 6-5/8" Q.D. x .718" Thk.
 Thickness Range this test qualifies 3/16" to 1.4"
 Filler Metal Group No. F-7 (F-6/F-5)^a FLUX OR ATMOSPHERE
 Weld Metal Analysis No. A-7 (A-8)^a Flux Trade Name or Composition Argon
 Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
 or QN-11.2 Trade Name Flow Rate 20 CFH
 For oxyacetylene welding—State if Filler Metal is sil- Is Backing Strip used? None
 icon or aluminum killed. Preheat Temperature Range 50°F Min.
 Interpass Temperature Range 350°F Max.
 Postheat Treatment None
 WELDING PROCEDURE
 Single or Multiple Pass Multiple
 Single or Multiple Arc Single
 Position of Groove Horizontal (2G) (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
 (Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32, 1/8, 5/32 WELDING TECHNIQUES
 Trade Name Chromend - Chromenar Join Dimensions Accord with Sheet 2 of 5
 Type of Backing Argon Gas amps 45-140 volts 13-24 inches per min. Sheet 1 of 5
 Forehand or Backhand Reverse (SMAW) Current DC Polarity Reverse (SMAW)

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions Width, Thickness	Area, sq. in.	Ultimate Tensile, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
9.2/1	.755 .458	.348	30,600	86,200	Base Metal
9.2/2	.754 .469	.354	31,200	88,000	Base Metal

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Q-7.1 SB-1	Bent 180° - OK	Q-7.1 SB-3	Bent 180° - OK
Q-7.1 SB-2	Bent 180° - OK	Q-7.1 SB-4	Bent 180° - OK

Results of Filler Weld Tests, Fig. Q-9(c)

Welder's Name H. Knarr Clock No. 82 Stamp No. BT
 Who by virtue of these tests meets welder performance requirements.
 Test Conducted by Frank Richards Laboratory—Test No. 71-35-9
 for _____

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed The M. W. Kellogg Company
 (Manufacturer)

Date 3/28/68 By F. J. Richards

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. P8-K1-F5-SMAW-5G Date 3/28/68 Rev. Date 2/19/70 & 6/11/71
 Welding Process GTAW & SMAW Manual or Machine Manual
 Material Specification A312 to A312 of P-No. 8 to P-No. 8
 Thickness (if pipe, diameter and wall thickness) 6-5/8" O.D. x .718" Thk.
 Thickness Range this test qualifies 3/16" to 1.4" Thk.
 Filler Metal Group No. E-7 (F6/E5)^A FLUX OR ATMOSPHERE
 Weld Metal Analysis No. A-7 (A-8)^A Flux Trade Name or Composition Argon
 Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
 or QN-11.2 ----- Trade Name ----- Flow Rate 20 CFH
 For oxyacetylene welding—State if Filler Metal is sil- Is Backing Strip used? None
 icon or aluminum killed. Preheat Temperature Range 50° F. min.
 WELDING PROCEDURE Interpass Temperature Range 350° F. max.
 Single or Multiple Pass Multiple Postheat Treatment None
 Single or Multiple Arc Single
 Position of Groove Vertical (5G) up (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
 (Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32" & 1/8" WELDING TECHNIQUES
 Trade Name Chromenar and Chromend Joint Dimensions Accord with Sheet 2 of 5
 Type of Backing Argon Gas amps 45-110 volts 24-25 inches per min. sheet 1 of 5
 Forehand or Backhand ----- Current DC Polarity Straight (GTAW)
 Reverse (SMAW)

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
9.5/1	.753	.464	.349	30,800	88,300	Base Metal
9.5/2	.754	.465	.350	31,600	88,300	Base Metal

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Q-7.1 SB-1	Bent 180° - OK	Q-7.1 SB-3	Bent 180° - OK
Q-7.1 SB-2	Bent 180° - OK	Q-7.1 SB-4	Bent 180° - OK

Results of Fillet Weld Tests, Fig. Q-9(c)

Welder's Name H. Knarr Clock No. 82 Stamp No. BT
 Who by virtue of these tests meets welder performance requirements.
 Test Conducted by Frank Richards Laboratory—Test No. 71-35-9
 per -----

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed The M. W. Kellogg Company
 (Manufacturer)

Date 3/28/68 By F. J. Richards

(Note: If of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

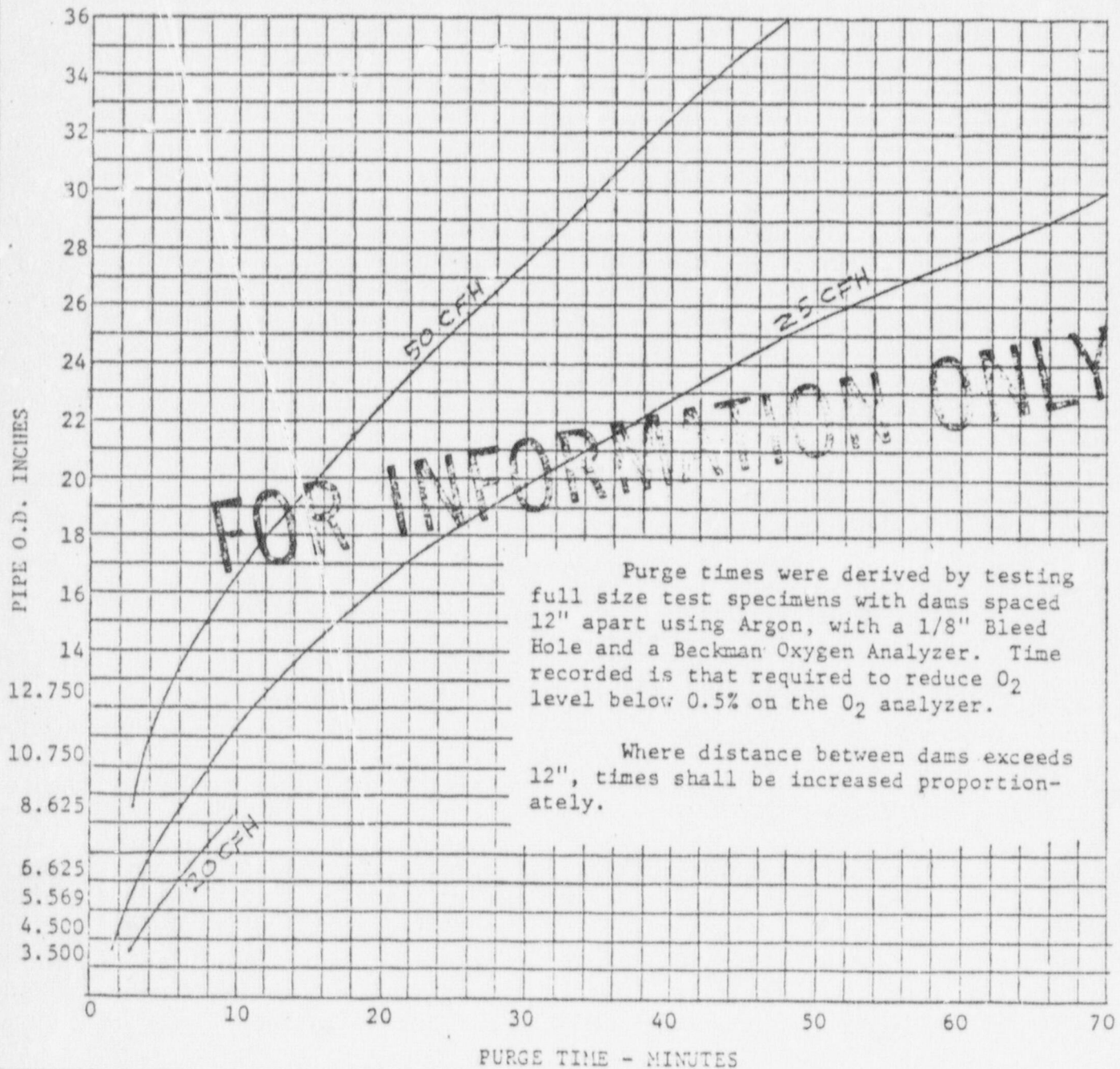
NOTE: Any essential variables in addition to those above shall be recorded.

REV 8/31/77 A

BACKING GAS PURGE

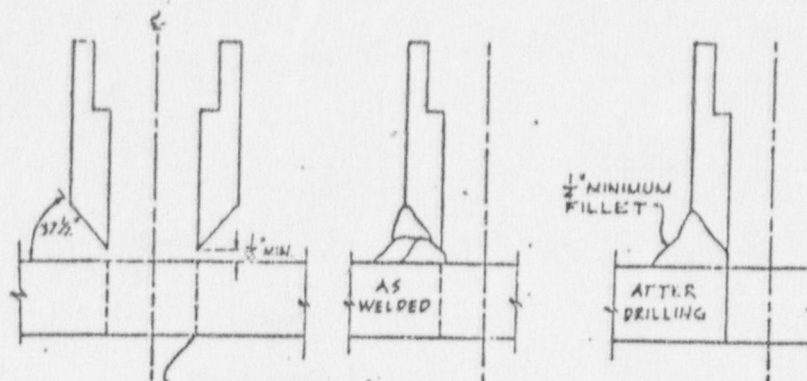
This procedure is to be followed to assure that the oxygen content has been reduced to a desired degree of inertness (1% oxygen or less).

- (1) Oxygen content of backing gas purge may be checked by any acceptable type of oxygen analyzer.
- (2) In lieu of an oxygen analyzer the following chart may be used:

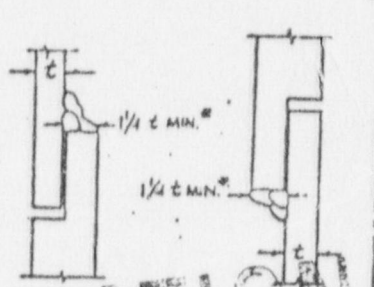
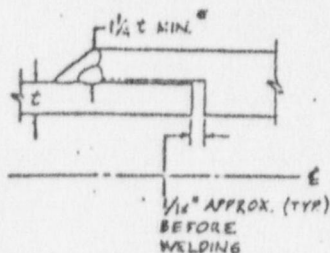


By: E. F. GERWIN
Title: Chief Engineer

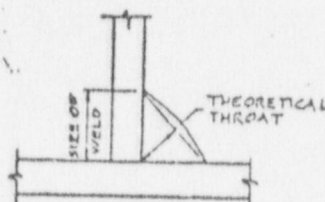
JOINT DETAILS AND WELDING TECHNIQUES



Hole thru header
may be drilled or
cut before or after
welding.



FOR INFORMATION ONLY



PARTIAL JOINT PENETRATION
SQUARE GROOVE WELD

Filletts or socket may have 2-3 or more passes to meet the minimum 1 1/4 T requirements.

PASS NO. AND PROCESS	FILLER METAL TYPE OPTIONAL	FILLER METAL SIZE	AMPS	MAX. VOLTS	POLARITY	TORCH SHIELD & FLO RATE (MIN.)	TUNGSTEN SIZE AND POLARITY
ALL SMAW	E7015, 16 or 18	3/32 1/8 5/32 3/16	65-110 100-165 140-220 180-275	27 31 34 36	Reverse	---	---
GTAW for Tack Welds Optional	E70S-2 or -6	1/16 3/32 1/8	90-120 100-165 140-190	14 17 20	Straight	Argon 20 CFH	1/8 or 3/32 diameter straight

AS WELDED

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE QUALIFICATION TESTS

Specification No. (From P1-0B-F4-SMAW-4-2G) Date 4/4/67, 9-7-77
Welding Process SMAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 6-5/8" O.D. x .280" W.
Thickness Range this test qualifies 1/16" thru .560"
Filler Metal Group No. F-4 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition None
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition None
or QN-11.2 Trade Name --- Flow Rate ---
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No
Preheat Temperature Range 50°F. Min.
Interpass Temperature Range 11 11
Postheat Treatment None
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove 2G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 3/8"
Trade Name Airco E7018 WELDING TECHNIQUES
Type of Backing None Joint Dimensions Accord with STANDARD BEVEL (37 1/2°)
Forehand or Backhand --- amps 65-190 volts 27-34 inches per min. ---
Current D.C. Polarity Reverse

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
3-2-1	.745	.182	.136	9,800	72,000	Broke in Base Metal
3-2-2	.744	.206	.153	11,100	72,500	Broke in Base Metal

Type and Figure No.	Result	Type and Figure No.	Result
Face Bend Q-7.2	Passed at 180°	Face Bend Q-7.2	Passed at 180°

Results of Fillet Weld Tests, Fig. Q-9(c) _____
Welder's Name R. Lataha Clock No. 163 Stamp No. EF
Who by virtue of these tests meets welder performance requirements.
Test Conducted by M.W. KELLOGG CO. Laboratory—Test No. 71-35-3
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M. W. KELLOGG COMPANY
(Manufacturer)

Date 4/4/67 By F.J. Richards

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

HEAT TREATED

THE M.W. KELLOGG COMPANY
A DIVISION OF PULLMAN INCORPORATED
PIPING FABRICATION

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RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. (From P1-SMA-2G) _____ Date 6/25/69 9-7-77
Welding Process SMAW Manual or Machine Manual
Material Specification A-106-C to A-106-C of P-No. 1 to P-No. -1
Thickness (if pipe, diameter and wall thickness) 10-3/4" O.D. x 1-5/8" W.
Thickness Range this test qualifies 3/16" thru 3/4"
Filler Metal Group No. F-4
Weld Metal Analysis No. A-1
Describe Filler Metal if not included in Table Q-11.2 or QN-11.2 _____
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. _____
FLUX OR ATMOSPHERE
Flux Trade Name or Composition _____
Inert Gas Composition _____
Trade Name _____ Flow Rate _____
Is Backing Strip used? NO
Preheat Temperature Range 175°F. Min.
Interpass Temperature Range 11 11
Postheat Treatment 1100-1200°F. w/3 1/2 hr. hold
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove Horizontal 2G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 3/32", 1/8", 5/32", 3/16"
Trade Name Atom ARC 7018
Type of Backing None
Forehand or Backhand _____
WELDING TECHNIQUES
Joint Dimensions Accord with STANDARD BEVEL (37.5°)
amps 65-225 volts 27-36 inches per min. _____
Current D.C. Polarity Reverse

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb	Ultimate Unit Strength, psi	Character of Failure and Location
	Width	Thickness				
SMA2-1	.753	.1755	.559	43,500	77,200	Broke in Weld
SMA2-2	.747	.1760	.568	40,800	71,200	Broke in Weld

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
SB-1		SB-3	
Q-7.1	180° Passed	Q-7.1	180° Passed
SB-2		SB-4	
Q-7.1	180° Passed	Q-7.1	180° Passed

Results of Filler Weld Tests, Fig. Q-9(c)

Welder's Name R. Flick Clock No. 116 Stamp No. RF
Who by virtue of these tests meets welder performance requirements.
Test Conducted by THE M.W. KELLOGG CO. Laboratory—Test No. ML-9-17
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 6/25/69

By F.J. Richards

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

AS WELDED

THE M.W. KELLOGG COMPANY
A DIVISION OF PULLMAN INCORPORATED
PIPING FABRICATION

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RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. (From P1-OB-F4-SMAW-7-2G) _____ Date 7/2/70, 4-7-77
Welding Process SMAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 12-3/4" O.D. x .406" M/W
Thickness Range this test qualifies 3/16" thru .750"
Filler Metal Group No. F-4 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition None
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition None
or QN-11.2 Trade Name --- Flow Rate ---
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No
Preheat Temperature Range 50°F. Min.
Interpass Temperature Range 50°F. MIN.
Postheat Treatment None
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove 5G up (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 3/16", 1/8", 5/32"
Trade Name ATOM ARC #7018
Type of Backing None
Forehand or Backhand ---

WELDING TECHNIQUES

Joining Dimensions Accord with STANDARD BEVEL (37 1/2°)
amps 65-220 volts 27-34 inches per min. ---
Current D.C. Polarity Reverse

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Tensile Stress, ksi	Character of Fracture and Location
	Width	Thickness				
C-935-1	.757	.379	.287	21,900	76,300	Broke in Base Metal
C-935-2	.755	.381	.288	22,600	78,500	Broke in Base Metal

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Side Bend Q-7.1	Passed at 180°	Side Bend Q-7.1	Passed at 180°
Side Bend Q-7.1	Passed at 180°	Side Bend Q-7.1	Passed at 180°

Results of Fillet Weld Tests, Fig. Q-9(c)

Welder's Name H. Dunlap Clock No. 81 Stamp No. LK
Who by virtue of these tests meets welder performance requirements.
Test Conducted by THE M.W. KELLOGG CO. Laboratory-Test No. ML7-71
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 7/2/70By F.J. RICHARDS

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

HEAT TREATED

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. (From P1-SMA-5G) Date 6/25/69, 9-7-77
Welding Process SHAW Manual or Machine Manual
Material Specification A-106-C to A-106-C of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 10-3/4" O.D. x 1-5/8" W.
Thickness Range this test qualifies 3/16" thru 3-1/4"
Filler Metal Group No. F-4 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition ---
or QN-11.2 Trade Name --- Flow Rate ---
For oxyacetylene welding—State if Filler Metal is sil- Is Backing Strip used? NO
icon or aluminum killed. Preheat Temperature Range 175°F. Min.
Interpass Temperature Range 175°F. Min.
Postheat Treatment 1100°F-1200°F W/3 1/2 hr. hold
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove Vertical 5G up (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 3/32", 1/8", 5/16", 3/8" WELDING TECHNIQUES
Trade Name Atom Arc 7018 Joint Dimensions Accord with STANDARD BEVEL (37 1/2°)
Type of Backing None amps 65-275 volts 27-36 inches per min. ---
Forehand or Backhand --- Current D.C. Polarity Reverse

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Tensile Strength, lb.	Ultimate Tensile Strength, psi	Character of Failure and Location
	Width	Thickness				
SMA-5-1	.757	.757	.579	40,200	70,200	Broke in Weld
SMA-5-2	.764	.758	.579	41,000	70,800	Broke in Weld

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
SB-1		SB-3	
Q-7.1	180° Passed	Q-7.1	180° Passed
SB-2		SB-4	
Q-7.1	180° Passed	Q-7.1	180° Passed

Results of Fillet Weld Tests, Fig. Q-9(c)

Welder's Name R. Flick Clock No. 116 Stamp No. RF
Who by virtue of these tests meets welder performance requirements.
Test Conducted by THE M.W. KELLOGG CO. Laboratory—Test No. ML-9-17
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 6/25/69By F.J. Richards

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

AS WELDED

THE M.W. KELLOGG COMPANY
A DIVISION OF PULLMAN INCORPORATED
PIPING FABRICATION

Page 7 of 9
Proc. Code 92/93

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

For tack welds

Specification No. PI-08-FG-ETAW-66/TO BE USED w/PI-08-F4-SAW-246 Date 6/15/73 9-7-77
Welding Process GTAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 2-3/8" O.D. x .218 W
Thickness Range this test qualifies 1/16" Thk. to max. / 3" O.D. and Below
Filler Metal Group No. F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
or QN-11.2 Trade Name --- Flow Rate 20 to 40 CFH
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No
Preheat Temperature Range 50°F. Min.
Interpass Temperature Range " "
Postheat Treatment None
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove 6G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32 and 1/8 WELDING TECHNIQUES 10
Trade Name Linde 65 E70S-2 Joint Dimensions Accord with 37 1/2
Type of Backing None amps 95-190 volts 17-20 inches per min. 4 IPM
Forehand or Backhand --- Current D.C. Polarity Straight

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
1	.190	Rd.	.02835	2175	76700	Weld
2	.18	Rd.	.02746	1940	76000	Weld

FOR INFORMATION ONLY

GUIDE BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Root-1	Satisfactory	Face-1	Satisfactory
Root-1	Satisfactory	Face-2	Satisfactory

Results of Fillet Weld Tests, Fig. Q-9(c)

Welder's Name K. Iten Clock No. 1031 Stamp No. K
Who by virtue of these tests meets welder performance requirements.
Test Conducted by Magnaflux Testing Labs Laboratory—Test No. 57233-6-3
per R. Hemmerlin

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 6/15/73By H.A. LaForte

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

AS WELDED

THE M. W. KELLOGG COMPANY
A DIVISION OF PULLMAN INCORPORATED
PIPING FABRICATION

Page 8 of 9
Proc. Code 92/93

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

For tack welds

Specification No. A-106-B / TO BE USED w/ P-05-F4-SANAN-24/56 Date 6/15/73, 9-7-77 A
Welding Process GTAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 6-5/8 O.D. x .280 Wall
Thickness Range this test qualifies 1/16" to .560 W / 3" IPS and over
Filler Metal Group No. F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
or QN-11.2 Trade Name --- Flow Rate 20 to 40 CFH
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No
Preheat Temperature Range 500F. Min.
Interpass Temperature Range ---
Postheat Treatment None
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove 6G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32 and 1/8 WELDING TECHNIQUES
Trade Name Linde 65 E70S-2 Joint Dimensions Accord with 37¹⁰
Type of Backing None amps 95-190 Volts 17-20 inches per min. 4 IPM
Forehand or Backhand --- Current D.C. Polarity Straight

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Tensile Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
1	.188	.02176	.02176	2250	81100	PM
2	.188	.02776	.02776	2180	78500	PM

Minimum Requirement

60000

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Root-1	Satisfactory	Face-1	Satisfactory
Root-2	Satisfactory	Face-2	Satisfactory

Results of Fillet Weld Tests, Fig. Q-9(c)

Welder's Name K. Iten Clock No. --- Stamp No. 4

Who by virtue of these tests meets welder performance requirements.

Test Conducted by Magnaflux Testing Labs Laboratory—Test No. 57233-6-4per R. Hemmerlin

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M. W. KELLOGG COMPANY
(Manufacturer)

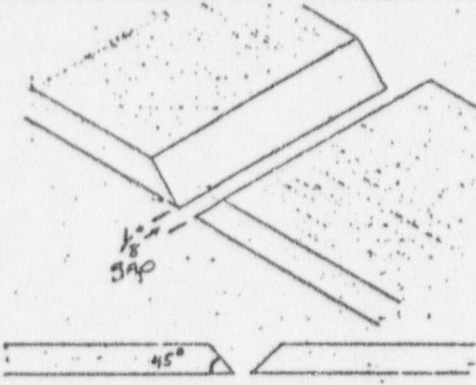
Date 6/15/73 By H. A. LaForte

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to the above shall be recorded.

QW-483 Procedure Qualification Record (PQR)
(See QW-201.2)

PROCEDURE QUALIFICATION RECORD NO. 2749 DATE 9-7-77
11-16-76
WPS NO. 92/93 OPEN BUTT
WELDING PROCESS(ES) SMAW TYPES MANUAL
(Manual, Automatic, Semi-Aut.)

 Groove Design Used	BASE METALS (QW-403) Material Spec. <u>A441</u> Type or Grade <u>GRADE 70</u> P No. <u>1</u> to P No. <u>1</u> Thickness <u>1" PLATE</u> Diameter <u>N/A</u> Other <u>N/A</u>
FILLER METALS (QW-404) Weld Metal Analysis A No. <u>5.1</u> Size of Electrode <u>3/32" & 1/8"</u> Filler Metal F No. <u>5.1</u> SFA Specification <u>5.1</u> AWS Classification <u>E7018</u> Other <u>N/A</u>	POSITION (QW-405) Position of Groove <u>UPHILL</u> Weld Progression <u>UPHILL</u> (Uphill, Downhill) Other <u>N/A</u> PREHEAT (QW-406) Preheat Temp. <u>NONE</u> Interpass Temp. <u>500° MAX</u> Other <u>N/A</u>
POSTWELD HEAT TREATMENT (QW-407) Temperature <u>N/A</u> Time <u>N/A</u> Other <u>N/A</u>	GAS (QW-408) Type of Gas or Gases <u>N/A</u> Composition of Gas Mixture <u>N/A</u> Other <u>N/A</u>
ELECTRICAL CHARACTERISTICS (QW-409) Current <u>DC</u> Polarity <u>REVERSE</u> Amps <u>OTHER</u> Volts <u>27-34</u> <u>3/32" - 65 TO 110 AMPS</u> Other <u>1/8" - 100 TO 165 AMPS</u>	TECHNIQUE (QW-410) String or Weave Bead <u>STRINGER ONLY</u> Oscillation <u>ONE ELECTRODE DIA</u> Multipass or Single Pass <u>MULTI PASS</u> (per side) Single or Multiple Electrodes <u>SINGLE</u> Travel Speed <u>1 TO 7 IPM</u>

FOR INFORMATION ONLY

QW-483 Procedure Qualification Record (PQR) (Cont'd)
(See QW-201.2)

TENSILE TEST (QW-150)

SPECIMEN NO.	IN. WIDTH	IN. THICKNESS	IN ² AREA	ULTIMATE TOTAL LOAD LB.	ULTIMATE UNIT STRESS PSI	CHARACTER OF FAILURE & LOCATION
1	1.025	0.975	1	85,200	85,200	PM
2	1.20	1.00	1.2	83,000	69,200	PM

GUIDED BEND TESTS (QW-160)

TYPE AND FIGURE NO.	RESULT	TYPE AND FIGURE NO.	RESULT
3G SIDE	ACCEPTABLE	3G SIDE	ACCEPTABLE
3G SIDE	ACCEPTABLE	3G SIDE	ACCEPTABLE

TOUGHNESS TESTS (QW-170) N/A

SPECIMEN NO.	NOTCH LOCATION	NOTCH TYPE	TEST TEMP.	IMPACT VALUES	LATERAL EXP. - % SPLIT	DROP WEIGHT BREAK	NO BREAK

Type of Test N/A
Deposit Analysis N/A
Other N/A

FILLET WELD TEST (QW-180)

Result - Satisfactory N/A Penetration into Parent Metal N/A
Yes, No
Type and Character of Failure N/A Macro-Results N/A
Welder's Name B. BOONE Clock No. 1105 Stamp No. FZ
Tests conducted by: BRUCE WILLARD Laboratory Test No. 2749
per: ASME SECT IX; AWS D1.1-76

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)
By Bruce Willard

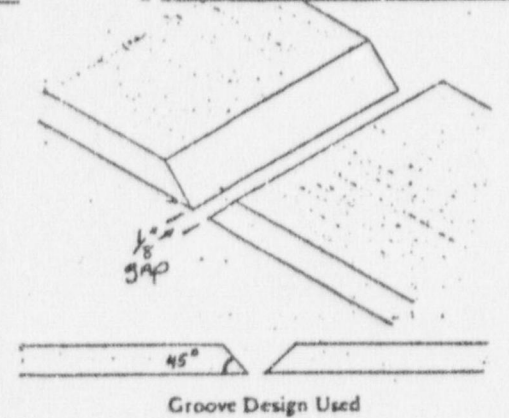
Date NOVEMBER 16, 1976

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

This Form obtainable from the Order Dept., ASME, 345 E. 47th St., New York, N. Y. 10017

QW-483 Procedure Qualification Record (PQR)
(See QW-201.2)

THE M.W. KELLOGG COMPANY 9-7-77
PROCEDURE QUALIFICATION RECORD NO. 2748 DATE 11-2-76
WPS NO. 92/93 OPEN BUTT
WELDING PROCESS(ES) SMAW TYPES MANUAL
(Manual, Automatic, Semi-Aut.)

 Groove Design Used	BASE METALS (QW-403) -- Material Spec. A441 Type or Grade GRADE 70 P No. 1 to P No. 1 Thickness 1" PLATE Diameter N/A Other N/A
FILLER METALS (QW-404) Weld Metal Analysis A No. Size of Electrode 3/32" & 1/8" Filler Metal No. 4 A Specification 5 AWS Classification E7018 Other N/A	POSITION (QW-405) Position of Groove 2G, 4G Weld Progression UPHILL (Uphill, Downhill) Other N/A PREHEAT (QW-406) Preheat Temp. NONE Interpass Temp. 500° MAX Other N/A
POSTWELD HEAT TREATMENT (QW-407) Temperature N/A Time N/A Other N/A	GAS (QW-408) Type of Gas or Gases N/A Composition of Gas Mixture N/A Other N/A
ELECTRICAL CHARACTERISTICS (QW-409) Current DC Polarity REVERSE Amps. OTHER Volts 27-34 3/32" - 65 to 110 AMPS Other 1/8" - 100 to 165 AMPS	TECHNIQUE (QW-410) String or Weave Bead BOTH Oscillation TWO ELECTRODE DIA. 1/8" Multipass or Single Pass MULTIPASS (per side) Single or Multiple Electrodes SINGLE Travel Speed 1 to 7 IPM

QW-483 Procedure Qualification Record (PQR) (Cont'd)
(See QW-201.2)

TENSILE TEST (QW-150)

SPECIMEN NO.	DIA.	AREA	N/A	ULTIMATE TOTAL LOAD LB.	ULTIMATE UNIT STRESS PSI	CHARACTER OF FAILURE & LOCATION
2G-1	.501	.1971		13500	68500	PM
2G-2	.502	.1979		13575	68600	PM
4G-1	.502	.1979		13650	69000	PM
4G-2	.500	.1963		13425	68400	PM

GUIDED BEND TESTS (QW-160)

TYPE AND FIGURE NO.	RESULT	TYPE AND FIGURE NO.	RESULT
2G SIDE	ALL FOUR ACCEPTABLE	4G SIDE	ALL FOUR ACCEPTABLE

TOUGHNESS TESTS (QW-170) N/A

SPECIMEN NO.	NOTCH LOCATION	NOTCH TYPE	TEST TEMP.	IMPACT VALUES	LATERAL EXP. % SHEAR	EXP. MM'S	DROP WEIGHT BREAK	NO BREAK

Type of Test N/A
Deposit Analysis N/A
Other N/A

FILLET WELD TEST (QW-180)

Result - Satisfactory N/A Penetration into Parent Metal N/A
Yes, No Yes, No
Type and Character of Failure N/A Macro-Results N/A
Welder's Name R. BOONE Clock No. 1105 Stamp No. FZ
Tests conducted by: M. JOYNER Laboratory Test No. 2748
per: ASME SECT. IX: AWS D1.1-76

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M. W. KELLOGG COMPANY

Date NOVEMBER 9, 1976

By Bruce Willard (Manufacturer)

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code.)

This Form obtainable from the Order Dept., ASME, 345 E. 47th St., New York, N. Y. 10017

HEAT TREATED

THE M.W. KELLOGG COMPANY
A DIVISION OF PULLMAN INCORPORATED
PIPING FABRICATION

Page 9 of 9
Proc. Code 92/93

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
For tack welds QUALIFICATION TESTS

Specification No. PI-08-FL-GTAW-66/TORQ USED W/PI-08-FY-SMAW-26/56 Date 6/15/73, 9-7-73

Welding Process GTAW Manual or Machine Manual

Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1

Thickness (if pipe, diameter and wall thickness) 6-5/8 O.D. x .280 W

Thickness Range this test qualifies 1/16" to .560 W / 3" ips and over

Filler Metal Group No. F-6 FLUX OR ATMOSPHERE

Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---

Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon

or QN-11.2 Trade Name --- Flow Rate 20 to 40 CFH

For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No

Preheat Temperature Range 50°F. Min.

Interpass Temperature Range ---

Postheat Treatment 1100 to 1250°F.

Single or Multiple Pass Multiple *600°F. max. per hr. to 1175°F., hold 1 hr. at

Single or Multiple Arc Single 1175°F. Furnace

Position of Groove 6G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3) cooled to 1000°F. A/C

(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32/ and 1/8 WELDING TECHNIQUES

Trade Name Linde 65 E70S-2 Joint Dimensions Accord with 27 1/2

Type of Backing None amps 95-190 volts 17-20 inches per min. 1 PM

Forehand or Backhand --- Current D.C. Polarity ---

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Ultimate Tensile Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location	
	Width	Thickness				
1	.189	Rd.	.02776	2160	77800	PM
2	.189	Rd.	.02806	2175	77500	PM

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Root-1	Satisfactory	Face-1	Satisfactory
Root-2	Satisfactory	Face-2	Satisfactory

Results of Filler Weld Tests, Fir Q-9(c) ---

Welder's Name K. Iken Clock No. --- Stamp No. K

Who by virtue of these tests meets welder performance requirements.

Test Conducted by Magnaflux Testing Labs Laboratory-Test No. 57233-6-9

per R. Hennerlin

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 6/15/73 By H.A. LaForte

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

PROCEDURE SPECIFICATION FOR: Carbon steel piping, GTAW (root), and SMAW (build-up).

BASE METAL: The base metal shall conform to the specifications for ASME, Section IX, P-1 materials.

FILLER METAL: The filler metal shall conform to ASME Filler Metal Specifications Number SFA-5.1 and SFA-5.18 for ferrous filler metal in Group Number F-4 and F-6.

The chemical composition of the weld deposit shall fall within the limits of weld metal Analysis Number A-1.

GAS FOR TORCH SHIELD: Nominal composition of argon, 99.995% minimum purity (for GTAW process).

FOR BACK-UP PURGE: Argon per Page 10 or no purge per Qualification Test Records, Pages 7, 8, and 9.

TACK WELDS FOR SET-UP: The GTAW process using filler metal type listed on Page 2 may be used with or without back-up purge in 1/16, 3/32, or 1/8" diameter. Test reports are Pages 7, 8, and 9.

POSITION: The welding may be done in all positions.

PREHEAT AND INTERPASS: 50° F minimum, 175° minimum for material that has a carbon content in excess of 0.30% and 1" thickness.

POST HEAT TREATMENT: 1100°-1200° F 1 hour per inch minimum (See job specifications for cycle and thicknesses requiring post heat treatment).

BACKING STRIP: None

TRAVEL SPEED: GTAW -- $\frac{1}{2}$ " - 6" per min
SMAW -- 1" - 8" per min

WELDING PROCESS: The welding shall be done by the GTAW root and SMAW weld-out processes using manual equipment. The GTAW process may be used in the filler metal type listed on Page 2 for intermittent voids or mismatch in the root pass set-up. GTAW welding shall be done using a nonconsumable electrode of 2% Thoriated Tungsten, EWT-2.

BASE METAL THICKNESS: This procedure is qualified to allow the welding of the following: A. With Purge, 3/16" thru 3.624" in the as welded condition and 3/16" thru 3.624" in the heat treated condition. B. Without Purge, 3" OD and smaller in thicknesses 1/16" thru the maximum to be welded in the aswelded condition, 3" IPS and over in thicknesses 3/16" thru 3.624" in the as welded condition, and 3" IPS and over in thickness 3/16" thru 3.624" in the heat treated condition.

PREPARATION OF BASE MATERIAL: The edges or surfaces of the parts to be joined by welding shall be prepared by flame cutting, plasma arc, grinding, machining, or any combination of methods to essentially form the geometry of the weld shown on Page 2 as detailed on the attached sketches and shall be cleaned of all oil, grease, scale or rust.

ELECTRICAL CHARACTERISTICS: The current used shall be DC GTAW -- Straight Polarity
SMAW -- Reverse Polarity

JOINT WELDING PROCEDURE: The welding technique, such as electrode sizes, and voltages and currents for each electrode, size of the welding tip and filler rods, shall be substantially as shown on Page 2.

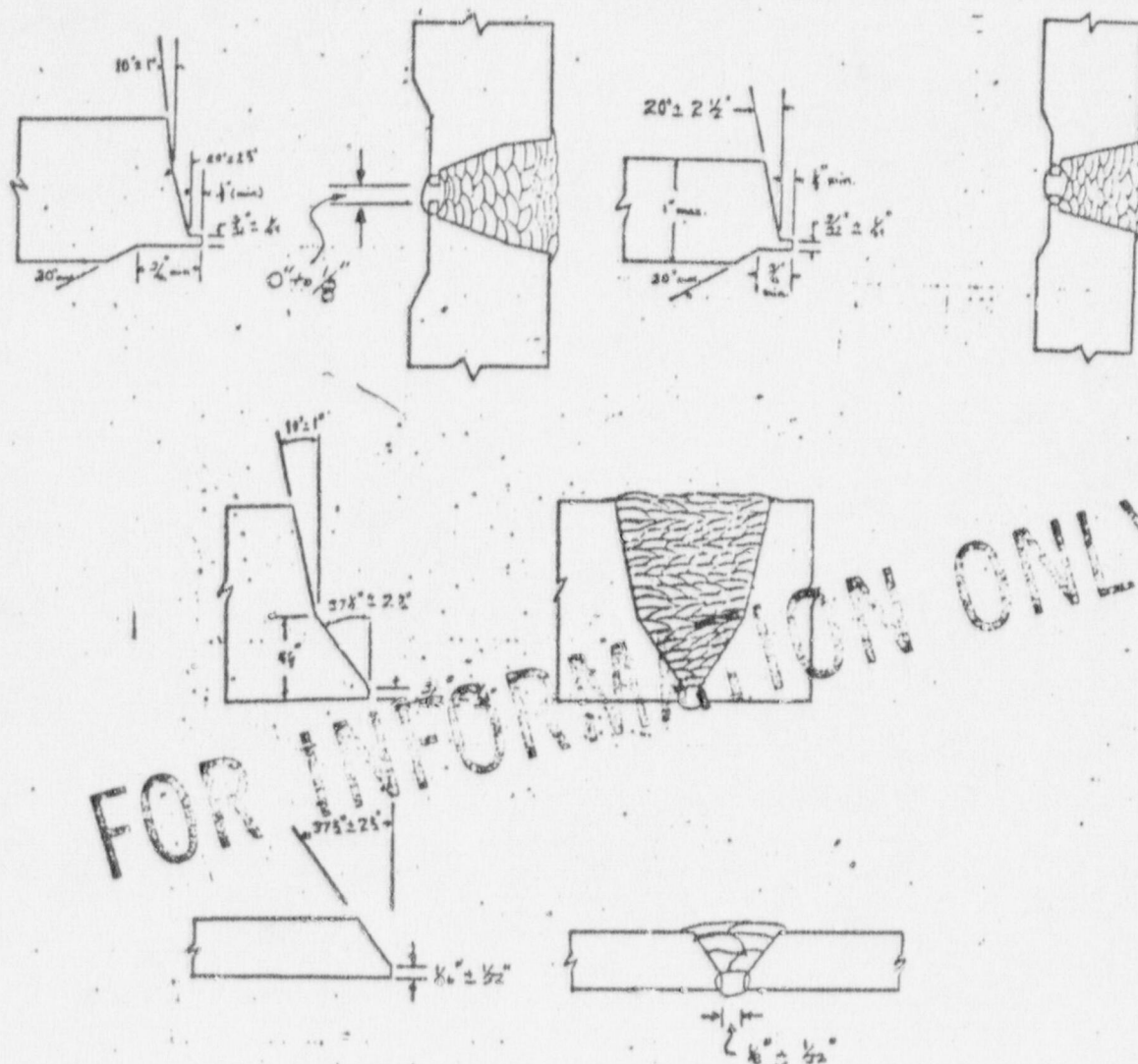
APPEARANCE OF WELDING LAYERS: The welding current and manner of depositing the weld metal shall be such that there shall be practically no undercutting on the side walls of the welding groove or the adjoining base material. See job specifications for specific undersutting limitations.

CLEANING: All slag or flux remaining on any bead of welding shall be removed before laying down the next successive bead of welding.

DEFECTS: Any cracks or blow holes that appear on the surface of any bead of welding shall be removed by chipping, grinding, or gouging before depositing the next successive bead of welding.

THIS PROCEDURE IS A RE-WRITE OF AND COMBINES: Code No. 88, PI-K-F4-SMAW-2G-2G
Code No. 89, PI-K-F4-SMAW-2G-5G

JOINT DETAILS AND WELDING TECHNIQUES



FOR INFORMATION ONLY

PASS NO. AND PROCESS	FILLER METAL TYPE OPTIONAL	FILLER METAL SIZE	AMPS	MAX. VOLTS	POLARITY	TORCH SHIELD & FLO RATE (MIN.)	TUNGSTEN SIZE AND POLARITY
Tack & root GTAW	E70S-2, or -6	1/16	60-120	14	Straight	Argon 20 CFH	1/8 or 3/32 Diameter Straight
		3/32	70-150	17			
		1/8	100-190	20			
Balance SMAW	E7015, 16, or 18	3/32	65-110	27	Reverse	---	---
		1/8	100-165	31			
		5/32	140-220	34			
		3/16	180-275	36			

NOTE: 1/16, 3/32, or 1/8 E 70S-2 or E 70S-6 bare filler metal may be used as applicable for intermittent voids or mismatch in root set-up.

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE QUALIFICATION TESTS

Specification No. PJ-QB-F4-SMAW-2G Date 7/9/70 9-7-77
Welding Process GTAW and SMAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 24" O.D. x 1.812" M/W
Thickness Range this test qualifies 3/16" thru .750"
Filler Metal Group No. F-4 and F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
or QN-11.2 Trade Name ----- Flow Rate 20 CFH
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No
Preheat Temperature Range 50°F. Min.
Interpass Temperature Range 50°F. Min.
Postheat Treatment None
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove Horizontal 2G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 1/8", 3/16", 1/4", 5/16" WELDING TECHNIQUES
Trade Name LINDE 65 & ATOM ARC 7018 Joint Dimensions Accord with STANDARD ORANGE (1 1/2")
Type of Backing Argon amps 70-180 of 10-34 inches per min.
Forehand or Backhand --- Current --- Polarity STRAIGHT (GTAW)
REDUCED SECTION TENSILE TEST SECS. Q-6 and QN-6 REVERSE (SMAW)

Specimen No.	Dimensions Width Thickness	Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
<u>C88-1</u>	<u>.727</u> <u>.760</u>	<u>.553</u>	<u>44,300</u>	<u>80,000</u>	<u>Broke in Base Metal</u>
<u>C88-2</u>	<u>.741</u> <u>.760</u>	<u>.563</u>	<u>46,800</u>	<u>83,100</u>	<u>Broke in Base Metal</u>

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
<u>C-SB-1</u>		<u>C-SB-3</u>	
<u>Q-7.1</u>	<u>180° Passed</u>	<u>Q-7.1</u>	<u>180° Passed</u>
<u>C-SB-2</u>		<u>C-SB-4</u>	
<u>Q-7.1</u>	<u>180° Passed</u>	<u>Q-7.1</u>	<u>180° Passed</u>

Results of Filler Weld Tests, Fig. Q-9(c) ---
Welder's Name G. Thomas/F. Lyautey Clock No. 169/120 Stamp No. EK/AR
Who by virtue of these tests meets welder performance requirements.
Test Conducted by THE M.W. KELLOGG CO. Laboratory—Test No. ML7-63
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 7/9/70 By F.J. Richards

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

HEAT TREATED

THE M.W. KELLOGG COMPANY
A DIVISION OF FULLMAN INCORPORATED
PIPING FABRICATION

Page 4 of 10
Proc. Code 88/89

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. P1-OB-F4-SMAW-2G Date 7/9/70, 9-7-77
Welding Process GTAW and SMAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 24" O.D. x 1.812" H/W
Thickness Range this test qualifies 3/16" Thru 3.624"
Filler Metal Group No. F-4 and F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
Trade Name --- Flow Rate 20 CFH
Is Backing Strip used? No
Preheat Temperature Range 50°F. min.
Interpass Temperature Range 50°F. min.
Postheat Treatment 1100-1200°F. W/4HR, Hold
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed.
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove Horizontal 2G (See Pars. & Figs. Q-2 & Q-3 or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 1/8" Trade Name LINDE 65-ATON ARC E7018 WELDING TECHNIQUES
Type of Backing Argon Joint Dimensions Accord with STANDARD BEVEL (37½°)
Forehand or Backhand --- amps 70-180 volts 13-30 inches per min. ---
Current DC Polarity STRAIGHT (GTAW)
REVERSE (SMAW)
REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Strength, psi	Character of Failure and Location
	Width	Thickness				
H88-1	.743	.759	.566	42,200	74,800	Broke in Weld
H88-2	.741	.764	.566	42,800	75,600	Broke in Weld

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
H-SB-1 Q-7.1	180° Passed	H-SB-3 Q-7.1	180° Passed
H-SB-2 Q-7.1	180° Passed	H-SB-4 Q-7.1	180° Passed

Results of Fillet Weld Tests, Fig. Q-9(c)
Welder's Name G. Thomas/F. Lyautey Clock No. 169/120 Stamp No. EK-AR
Who by virtue of these tests meets welder performance requirements.
Test Conducted by M.W. Kellogg Co. Laboratory-Test No. ML7-63
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 7/9/70 By F.J. RICHARDS
(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

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RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. PI-02-F4-SMAW-5G Date 7/9/70, 9-7-77
Welding Process GTAW and SMAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 24" O.D. x 1.812" M/W
Thickness Range this test qualifies 3/16" thru 7/8"
Filler Metal Group No. F-4 and F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
or QN-11.2 Trade Name --- Flow Rate 20 CFH
For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No
Preheat Temperature Range 50°F. min.
Interpass Temperature Range 50°F. min.
Postheat Treatment None

WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove Vertical 5G Up (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 1/8", 3/16", 1/4", 5/16" WELDING TECHNIQUES
Trade Name LINDE 65 & ATON ARC E7018 Joint Dimensions Accord with STANDARD BEVEL (37½°)
Type of Backing Argon amps 70-180 volts 13-34 inches per min. ---
Forehand or Backhand --- Current DC Polarity STRAIGHT (GTAW)
REVERSE (SMAW)

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
C89-1	.757	.74	.62	44,500	79,200	Broke in Weld
C89-2	.757	.74	.65	45,000	79,600	Broke in Weld

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
C-SB-1 Q-7.1	180° Passed	C-SB-3 Q-7.1	180° Passed
C-SB-2 Q-7.1	180° Passed	C-SB-4 Q-7.1	180° Passed

Results of Fillet Weld Tests, Fig. Q-9(c)

Welder's Name R. Webb/L. Greenway Clock No. 53/105 Stamp No. BL/BA
Who by virtue of these tests meets welder performance requirements.
Test Conducted by THE M.W. KELLOGG CO. Laboratory—Test No. ML7-64
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 7/9/70

By F.J. Richards

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

HEAT TREATED

RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE QUALIFICATION TESTS

Specification No. P1-08-F4-SMAW-5G Date 7/9/70 9-7-77
Welding Process GTAW and SMAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 24" O.D. x 1.812" M/W
Thickness Range this test qualifies 3/16" thru 3.624"
Filler Metal Group No. F-4 and F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
or QN-11.2 Trade Name --- Flow Rate 20 CFH
For oxyacetylene welding—State if Filler Metal is sil- Is Backing Strip used? No
icon or aluminum killed. Preheat Temperature Range 50°F. Min.
Interpass Temperature Range 50°F. min.
Postheat Treatment 1100 F-1200°F, w/3½ Hr. Hold
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove Vertical 5G Up (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY
Filler Wire—Diameter 1/16", 3/32", 1/8", 5/32" WELDING TECHNIQUES
Trade Name LINDE 65 & ATOM ARC E7018 Joint Dimensions accord with STANDARD BEVEL (37½°)
Type of Backing Argon amps 70-180 volts 13-34 inches per min. ---
Forehand or Backhand --- Current DC Polarity STRAIGHT (GTAW)
REVERSE (SMAW)
REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
H89-1	.740	.747	553	39,000	70,500	Broke in Weld
H89-2	.740	.749	553	39,600	71,500	Broke in Weld

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
H-SB-1 Q-7.1	180° Passed	H-SB-3 Q-7.1	180° Passed
H-SB-2 Q-7.1	180° Passed	H-SB-4 Q-7.1	180° Passed

Results of Filler Weld Tests, Fig. Q-9(c) _____
Welder's Name R. Webb/L. Greenway Clock No. 53/105 Stamp No. BL/BA
Who by virtue of these tests meets welder performance requirements.
Test Conducted by THE M.W. KELLOGG CO. Laboratory—Test No. M17-64
per F.J. Richards

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 7/9/70 By F.J. Richards

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

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RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. PI-08-F4-SHAW-5G Date 6/15/73
Welding Process GTAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 2-3/8" O.D. x .218 W
Thickness Range this test qualifies 1/16" Thk. to max. / 3" Size and Below
Filler Metal Group No. F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
or QN-11.2 Trade Name --- Flow Rate 20 to 40 CFH
For oxyacetylene welding—State if Filler Metal is sil- Is Backing Strip used? No
icon or aluminum killed. Preheat Temperature Range 500°F. Min.
Interpass Temperature Range " "
Postheat Treatment None
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove 6G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32 and 1/8 WELDING TECHNIQUES
Trade Name Linde 65 E705-2 Joint Dimensions Accord with 37¹⁰
Type of Backing None amps 95-190 volts 17-20 inches per min. PM
Forehand or Backhand Backhand Current D.C. Polarity Straight

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Tensile Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
1	.190	Rd	.02835	2175	76700	Weld
2	.187	Rd	.02746	1940	76000	Weld

Minimum Requirement 60000

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Root-1	Satisfactory	Face-1	Satisfactory
Root-2	Satisfactory	Face-2	Satisfactory

Results of Fillet Weld Tests, Fig. Q-9(c)

Welder's Name K. Iten Clock No. 1031 Stamp No. K
Who by virtue of these tests meets welder performance requirements.
Test Conducted by Magnaflux Testing Labs Laboratory—Test No. 57233-6-3
per R. Hemmerlin

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section 12 of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 6/15/73 By H.A. LaForte

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

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THE M.W. KELLOGG COMPANY
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RECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. PI-09-F4-SMAW-5G Date 6/15/73
Welding Process GTAW Manual or Machine Manual
Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
Thickness (if pipe, diameter and wall thickness) 6-5/8 O.D. x .280 Wall
Thickness Range this test qualifies 1/16" to .560 W / 3" Pipe and over
Filler Metal Group No. F-6 FLUX OR ATMOSPHERE
Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
or QN-11.2 Trade Name --- Flow Rate 20 to 40 CFH
For oxyacetylene welding—State if Filler Metal is sil- Is Backing Strip used? No
icon or aluminum killed. Preheat Temperature Range 50° F. Min.
Interpass Temperature Range " "
Postheat Treatment None
WELDING PROCEDURE
Single or Multiple Pass Multiple
Single or Multiple Arc Single
Position of Groove 6G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3)
(Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32 and 1/8 WELDING TECHNIQUES
Trade Name Linde 65 E70S-2 Joint Dimensions Accord with 37 1/2°
Type of Backing None amps 95-190 volts 17-20 inches per min. 4 IPM
Forehand or Backhand None Current D.C. Polarity Straight

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
1	.188	Rd.	.02776	2250	81100	PM
2	.188	Rd.	.02776	2180	78500	PM

Minimum Requirement 60000

GUIDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Root - 1	Satisfactory	Face-1	Satisfactory
Root-2	Satisfactory	Face-2	Satisfactory

Results of Filler Weld Tests, Fig. Q-9(c)

Welder's Name K. Iten Clock No. --- Stamp No. 4
Who by virtue of these tests meets welder performance requirements.
Test Conducted by Magnaflux Testing Labs Laboratory—Test No. 57233-6-4
per R. Hemmerlin

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)

Date 6/15/73By H.A. LaForte

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.

HEAT TREATEDRECOMMENDED FORM Q-1 MANUFACTURER'S RECORD OF WELDING PROCEDURE
QUALIFICATION TESTS

Specification No. PI-QB-F4-SMAW-2G & 5G Date 6/15/73
 Welding Process GTAW Manual or Machine Manual
 Material Specification A-106-B to A-106-B of P-No. 1 to P-No. 1
 Thickness (if pipe, diameter and wall thickness) 6-5/8 O.D. x .280 W
 Thickness Range this test qualifies 1/16" to .560 W / 3" Pipe and over
 Filler Metal Group No. F-6 FLUX OR ATMOSPHERE
 Weld Metal Analysis No. A-1 Flux Trade Name or Composition ---
 Describe Filler Metal if not included in Table Q-11.2 Inert Gas Composition Argon
 or QN-11.2 Trade Name --- Flow Rate 20 to 40 CFH
 For oxyacetylene welding—State if Filler Metal is silicon or aluminum killed. Is Backing Strip used? No
 Preheat Temperature Range 50°F. Min.
 Interpass Temperature Range " "
 Postheat Treatment 1100-1250 *
 Single or Multiple Pass Multiple *600 F. max. per hr. to 1175°F, hold 1 hr. at
 Single or Multiple Arc Single 1175°F-Furnace
 Position of Groove 6G (See Pars. & Figs. Q-2 & Q-3, or QN-2 & QN-3) cooled to 1000°F. AC
 (Flat, horizontal, vertical, or overhead; if vertical, state whether upward or downward)

WELDING PROCEDURE

FOR INFORMATION ONLY

Filler Wire—Diameter 3/32 and 1/8 WELDING TECHNIQUES
 Trade Name Linde 65 E70S-2 Joint Dimensions Accord with 37 1/2
 Type of Backing None amps 95-190 volts 17-20 inches per min. 4 IPM
 Forehand or Backhand --- Current D.C. Polarity Straight

REDUCED SECTION TENSILE TEST (Figs. Q-6 and QN-6)

Specimen No.	Dimensions		Area	Ultimate Total Load, lb.	Ultimate Unit Stress, psi	Character of Failure and Location
	Width	Thickness				
1	.188	Rd.	.02776	2160	77800	PM
2	.189	Rd.	.02806	2175	77500	PM

BENDED BEND TESTS (Figs. Q-7.1, Q-7.2, QN-7.1, QN-7.2, QN-7.3)

Type and Figure No.	Result	Type and Figure No.	Result
Root-1	Satisfactory	Face-1	Satisfactory
Root-2	Satisfactory	Face-2	Satisfactory

Results of Filler Weld Tests, Fig. Q-9(c)

Welder's Name K. Iten Clock No. --- Stamp No. K

Who by virtue of these tests meets welder performance requirements.

Test Conducted by Magnaflux Testing Labs Laboratory—Test No. 57233-6-9
per R. Hemmerlin

We certify that the statements in this record are correct and that the test welds were prepared, welded and tested in accordance with the requirements of Section IX of the ASME Code.

Signed THE M.W. KELLOGG COMPANY
(Manufacturer)Date 6/15/73By H.A. LaForte

(Detail of record of tests are illustrative only and may be modified to conform to the type and number of tests required by the Code. Recommended Form Q-1 is available for purchase at ASME Headquarters.)

NOTE: Any essential variables in addition to those above shall be recorded.