



MATERIAL CERTIFICATION

The herein described material has been manufactured or processed, sampled, tested, and inspected in accordance with the applicable API specifications and sales order requirements and meets the requirements for the grade indicated. Processing, product conformance verification, and API monogram application were performed at Texas Steel Conversion by an authorized API Marker.

CUSTOMER: STEEL SERVICE

SIZE : 2.875x0.276
UPSET: PH6II

GRADE : L80
PO# 8819
MFG. PROC.: SMLS
RANGE: R2+

SO# 024/0953B

HEAT TREAT : Q&T
MILL: TSC/HOLMES
SPEC: API:5CT (9th edition)

PSL: 1

TEST#	# JTS	HEAT #	LOT #
523845	200	305362	024918
523846	122	305362	024919
523847	100	305362	024920
523848	162	305348	024921
523849	100	305348	024922
523851	200	305349	024915
523852	200	305349	024916
523853	156	305349	024917

HEAT#	C	Si	Mn	P	S	Cr	Mo	Ni	V	Al	Nb	Sn	Ti	Cu	Ca	B
305362	.27	.22	.91	.006	.001	1.00	.40	.08	.005	.034	.004	.006	.002	.14		
305348	.28	.23	.92	.006	.001	1.01	.40	.08	.005	.044	.005	.007	.002	.14		
305349	.27	.20	.92	.006	.002	1.01	.41	.07	.005	.034	.003	.006	.002	.13		

The prime joints from the above referenced material were hydrostatically pressure tested to at least 10,000 PSI for a minimum of 5 seconds.

Austenitized at 1625°F and water spray quenched.

Tempered at 1350°F for approximately 30 minute(s) at temperature.

SR-16

1% CHROME

NDT DATA:

EMI BODY - (12.5% NOTCH / 87.5% R.B.W.), (ID/OD), (LG/TV) - BY TSC
FLVI - (OD FULL LENGTH & ID ENDS ONLY), (12.5% / 87.5% R.B.W.) - BY TSC
SEA - (WET MPI) (OD/ID ENDS), (LG/TV), (12.5% / 87.5% R.B.W.) - BY TSC

Rick Eddy

Rick Eddy
Q.A. Manager

4/2/19
DATE

RE/tp

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B

PO# 8819

PSL: 1

MILL: TSC/HOLMES

SIZE: 2.875X0.276

UPSET: PH6II

GRADE: L80

SPEC: API:5CT(9th edition)

.5% EUL

TEST # 523845

LOT # 24918

HEAT#: 305362

MFG.PROC. SMLS

HEAT TREAT: Q&T

JTS/LOT : 200

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq.In.)	YIELD STRENGTH (Lbs/Sq.In.)	TENSILE STRENGTH (Lbs/Sq.In.)	ELONG (IN 2")	ROA (%)
0.268X0.768	0.209	(F) 93300	103500	26.5	---
0.272X0.768	0.212	(B) 92400	103700	26.2	---
0.353 (BAR DIAM.)		(U) 91500	105500	23.6	68.2

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s (23.0 HRC MAX)

F-MID 18.5

B-MID 16.8

UPSET HARDNESS VARIATION (23.0 HRC MAX)

QUADRANT 1

F-O.D. M.H.N. 19.9

MID M.H.N. 19.5

I.D. M.H.N. 19.1

CHARPY IMPACT TEST

CHARPY TYPE STRIKER RADIUS 8mm	IMPACT (ft-lbs)	LATERAL EXPANSION (mils)	FRACTURE (% D/F)
LOCATION: BODY-MID WALL			
TESTED AT +32 °F	81	84	100
SIZE: 10x5	78	89	100
ORIENTATION: LONGITUDINAL	86	77	100
AVERAGE	82		

CHEMICAL PRODUCT ANALYSIS

#	C	Si	Mn	P	S	Cr	Mo	Ni	V	Al	Nb	Sn	Ti	Cu	Ca	B
1	.29	.23	.91	.010	.003	.94	.41	.09	.006	.033	.003	.006	.002	.14	.0004	.0008

Quality Department

DATE

4-1-19

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B SIZE: 2.875X0.276
PO# 8819 UPSET: PH6II
PSL: 1 GRADE: L80 .5 % EUL
MILL: TSC/HOLMES SPEC: API:5CT(9th edition)

TEST # 523845
LOT # 24918
HEAT#: 305362
MFG.PROC. SMLS
HEAT TREAT: Q&T
JTS/LOT : 200

CHARPY IMPACT TEST

CHARPY TYPE	IMPACT (ftXlbs)	LATERAL EXPANSION (mils)	FRACTURE (% D/F)
STRIKER RADIUS 8mm			
LOCATION: UPSET-MID WALL			
TESTED AT +32 °F	151	74	100
SIZE: 10x10	155	73	100
ORIENTATION: LONGITUDINAL	159	82	100
AVERAGE	155		


Quality Department

4-1-19
DATE

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

TEST # 523846

SO# 024/0953B

SIZE: 2.875X0.276

LOT # 24919

PO# 8819

UPSET: PH6II

HEAT#: 305362

PSL: 1

GRADE: L80 .5% EUL

MFG. PROC. SMLS

MILL: TSC/HOLMES

SPEC: API:5CT(9th edition)

HEAT TREAT: Q&T

JTS/LOT : 122

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq. In.)	YIELD STRENGTH (Lbs/Sq. In.)	TENSILE STRENGTH (Lbs/Sq. In.)	ELONG (IN 2")	ROA (%)
0.278X0.774	0.219	(B) 90900	101600	27.5	
0.273X0.753	0.209	(F) 92800	102800	25.6	

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s (23.0 HRC MAX)

UPSET HARDNESS VARIATION (23.0 HRC MAX)

B-MID 18.7

QUADRANT 1

F-MID 17.0

B-O.D. M.H.N. 19.1

MID M.H.N. 18.5

I.D. M.H.N. 18.3

CHEMICAL PRODUCT ANALYSIS

#	C	Si	Mn	P	S	Cr	Mo	Ni	V	Al	Nb	Sn	Ti	Cu	Ca	B
2	.29	.23	.91	.010	.003	.94	.42	.09	.007	.033	.003	.006	.002	.14	.0005	.0008

Quality Department

DATE

4-1-19

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B

PO# 8819

PSL: 1

MILL: TSC/HOLMES

SIZE: 2.875X0.276

UPSET: PH6II

GRADE: L80

SPEC: API:5CT(9th edition)

.5% EUL

TEST # 523847

LOT # 24920

HEAT#: 305362

MFG.PROC. SMLS

HEAT TREAT: Q&T

JTS/LOT : 100

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq.In.)	YIELD STRENGTH (Lbs/Sq.In.)	TENSILE STRENGTH (Lbs/Sq.In.)	ELONG (IN 2")	ROA (%)
0.276X0.773	0.217	(F) 91800	103100	27.8	----
0.277X0.758	0.213	(B) 90800	101900	26.8	----

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s(23.0 HRC MAX)

F-MID 19.1

B-MID 17.3

UPSET HARDNESS VARIATION (23.0 HRC MAX)

QUADRANT 1

F-O.D. M.H.N. 20.2

MID M.H.N. 19.9

I.D. M.H.N. 18.8


Quality Department

4-1-19
DATE

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B

PO# 8819

PSL: 1

MILL: TSC/HOLMES

SIZE: 2.875X0.276

UPSET: PH6II

GRADE: L80 .5% EUL

SPEC: API:5CT(9th edition)

TEST # 523848

LOT # 24921

HEAT#: 305348

MFG.PROC. SMLS

HEAT TREAT: Q&T

JTS/LOT : 162

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq.In.)	YIELD STRENGTH (Lbs/Sq.In.)	TENSILE STRENGTH (Lbs/Sq.In.)	ELONG (IN 2")	ROA (%)
0.279X0.759	0.215	(B) 91600	101800	26.8	
0.282X0.780	0.223	(F) 89800	102900	28.0	
0.347 (BAR DIAM.)		(U) 90200	104600	22.1	67.8

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s (23.0 HRC MAX)

B-MID 19.0

F-MID 17.3

UPSET HARDNESS VARIATION (23.0 HRC MAX)

QUADRANT 1

B-O.D. M.H.N. 19.9

MID M.H.N. 19.4

I.D. M.H.N. 19.4

CHARPY IMPACT TEST

CHARPY TYPE
STRIKER RADIUS 8mm

IMPACT
(ft-lbs)

LATERAL EXPANSION
(mils)

FRACTURE
(% D/F)

LOCATION: BODY-MID WALL

TESTED AT +32 °F

SIZE: 10x5

ORIENTATION: LONGITUDINAL

AVERAGE

75

79

82

79

77

79

75

100

100

100

CHEMICAL PRODUCT ANALYSIS

#	C	Si	Mn	P	S	Cr	Mo	Ni	V	Al	Nb	Sn	Ti	Cu	Ca	B
1	.30	.23	.92	.010	.003	.95	.42	.08	.007	.038	.003	.006	.002	.14	.0005	.0008

Quality Department

DATE

4-1-19

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B SIZE: 2.875X0.276
PO# 8819 UPSET: PH6II
PSL: 1 GRADE: L80 .5 % EUL
MILL: TSC/HOLMES SPEC: API:5CT(9th edition)

TEST # 523848
LOT # 24921
HEAT#: 305348
MFG.PROC. SMLS
HEAT TREAT: Q&T
JTS/LOT : 162

CHARPY IMPACT TEST

CHARPY TYPE STRIKER RADIUS 8mm	IMPACT (ftXlbs)	LATERAL EXPANSION (mils)	FRACTURE (% D/F)
LOCATION: UPSET-MID WALL			
TESTED AT +32 °F	168	85	100
SIZE: 10x10	168	82	100
ORIENTATION: LONGITUDINAL	161	76	100
AVERAGE	166		


Quality Department

4-1-19
DATE

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B

PO# 8819

PSL: 1

MILL: TSC/HOLMES

SIZE: 2.875X0.276

UPSET: PH6II

GRADE: L80 .5% EUL

SPEC: API:5CT(9th edition)

TEST # 523849

LOT # 24922

HEAT#: 305348

MFG.PROC. SMLS

HEAT TREAT: Q&T

JTS/LOT : 100

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq.In.)	YIELD STRENGTH (Lbs/Sq.In.)	TENSILE STRENGTH (Lbs/Sq.In.)	ELONG (IN 2")	ROA (%)
0.285X0.758	0.219	(F) 92400	103400	28.9	
0.274X0.773	0.215	(B) 92400	103500	29.1	

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s(23.0 HRC MAX)

F-MID 18.0

B-MID 18.3

UPSET HARDNESS VARIATION (23.0 HRC MAX)

QUADRANT 1

F-O.D. M.H.N. 18.6

MID M.H.N. 18.0

I.D. M.H.N. 18.1

CHEMICAL PRODUCT ANALYSIS

#	C	Si	Mn	P	S	Cr	Mo	Ni	V	Al	Nb	Sn	Ti	Cu	Ca	B
2	.30	.23	.93	.010	.003	.96	.42	.08	.007	.037	.003	.006	.002	.14	.0005	.0008

Quality Department

DATE

4-1-19

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B

PO# 8819

PSL: 1

MILL: TSC/HOLMES

SIZE: 2.875X0.276

UPSET: PH6II

GRADE: L80

SPEC: API:5CT(9th edition)

.5% EUL

TEST # 523851

LOT # 24915

HEAT#: 305349

MFG.PROC. SMLS

HEAT TREAT: Q&T

JTS/LOT : 200

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq.In.)	YIELD STRENGTH (Lbs/Sq.In.)	TENSILE STRENGTH (Lbs/Sq.In.)	ELONG (IN 2")	ROA (%)
0.282X0.773	0.221	(B) 90000	99900	29.9	
0.271X0.768	0.211	(F) 89500	100400	29.8	
0.349 (BAR DIAM.)		(U) 89900	103400	23.4	70.6

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s(23.0 HRC MAX)

B-MID 17.6

F-MID 16.3

UPSET HARDNESS VARIATION (23.0 HRC MAX)

QUADRANT 1

B-O.D. M.H.N. 17.8

MID M.H.N. 17.5

I.D. M.H.N. 17.4

CHARPY IMPACT TEST

CHARPY TYPE
STRIKER RADIUS 8mm

LOCATION: BODY-MID WALL

TESTED AT +32 °F

SIZE: 10x5

ORIENTATION: LONGITUDINAL

AVERAGE

IMPACT
(ft-lbs)

LATERAL EXPANSION
(mils)

FRACTURE
(% D/F)

75

70

100

72

70

100

77

72

100

75

CHEMICAL PRODUCT ANALYSIS

#	C	Si	Mn	P	S	Cr	Mo	Ni	V	Al	Nb	Sn	Ti	Cu	Ca	B
1	.31	.21	.94	.010	.003	.95	.42	.08	.007	.035	.003	.006	.002	.14	.0004	.0008

Quality Department

DATE

4-1-19

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B SIZE: 2.875X0.276
PO# 8819 UPSET: PH6II
PSL: 1 GRADE: L80 .5 % EUL
MILL: TSC/HOLMES SPEC: API:5CT(9th edition)

TEST # 523851
LOT # 24915
HEAT#: 305349
MFG.PROC. SMLS
HEAT TREAT: Q&T
JTS/LOT : 200

CHARPY IMPACT TEST

CHARPY TYPE	IMPACT (ftXlbs)	LATERAL EXPANSION (mils)	FRACTURE (% D/F)
STRIKER RADIUS 8mm			
LOCATION: UPSET-MID WALL			
TESTED AT +32 °F	146	79	100
SIZE: 10x10	142	71	100
ORIENTATION: LONGITUDINAL	151	72	100
AVERAGE	146		


Quality Department

4-1-19
DATE

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B

PO# 8819

PSL: 1

MILL: TSC/HOLMES

SIZE: 2.875X0.276

UPSET: PH6II

GRADE: L80

SPEC: API:5CT(9th edition)

.5% EUL

TEST # 523852

LOT # 24916

HEAT#: 305349

MFG.PROC. SMLS

HEAT TREAT: Q&T

JTS/LOT : 200

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq.In.)	YIELD STRENGTH (Lbs/Sq.In.)	TENSILE STRENGTH (Lbs/Sq.In.)	ELONG (IN 2")	ROA (%)
0.275X0.766	0.214	(F) 89500	99500	30.6	---
0.283X0.775	0.223	(B) 88500	100800	31.0	---

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s (23.0 HRC MAX)

F-MID 17.3
B-MID 15.4

UPSET HARDNESS VARIATION (23.0 HRC MAX)

QUADRANT 1
F-O.D. M.H.N. 17.4
MID M.H.N. 17.0
I.D. M.H.N. 17.0

CHEMICAL PRODUCT ANALYSIS

#	C	Si	Mn	P	S	Cr	Mo	Ni	V	Al	Nb	Sn	Ti	Cu	Ca	B
2	.30	.21	.93	.010	.003	.95	.42	.08	.007	.034	.003	.006	.002	.14	.0004	.0008

Quality Department

DATE

4-1-19

TEXAS STEEL CONVERSION, INC.

QUALITY TEST REPORT

CUSTOMER: STEEL SERVICE

SO# 024/0953B

PO# 8819

PSL: 1

MILL: TSC/HOLMES

SIZE: 2.875X0.276

UPSET: PH6II

GRADE: L80

SPEC: API:5CT(9th edition)

.5% EUL

TEST # 523853

LOT # 24917

HEAT#: 305349

MFG.PROC. SMLS

HEAT TREAT: Q&T

JTS/LOT : 156

TENSILE TEST

DIMENSIONS (Inches)	AREA (Sq.In.)	YIELD STRENGTH (Lbs/Sq.In.)	TENSILE STRENGTH (Lbs/Sq.In.)	ELONG (IN 2")	ROA (%)
0.278X0.779	0.220	(B) 88200	98800	26.5	
0.280X0.760	0.216	(F) 86600	98700	30.7	

BODY TYPE: LONGITUDINAL STRIP

TENSILE SPECIMEN HARDNESS M.H.N.s (23.0 HRC MAX)

B-MID 17.3

F-MID 17.8

UPSET HARDNESS VARIATION (23.0 HRC MAX)

QUADRANT 1

B-O.D. M.H.N. 17.5

MID M.H.N. 17.5

I.D. M.H.N. 17.3

Quality Department

DATE

4-1-19