

PRCI Hot Tap Analysis Input Report

30/12/2012 08:28:01p.m.

branch01b PQR branch CE<0.41

Joint Details

Pipe	Branch
Material = Low Carbon Steel	Material = Low Carbon Steel
Thickness = 0.3750 in	Thickness = 0.2800 in Branch Angle = 45.0000 Degree
Temperature = 25.0000 C	Temperature = 25.00 C Root Gap = 3.0000 mm
Outer Diameter = 24.0000 in	Outer Diameter = 6.6250 in

Base Metal Chemistry

Carbon: 0.15	Manganese: 1.23	Silicon: 0.23
Nickel: 0.03	Chrome: 0.04	Molybdenum: 0.00
Copper: 0.01	Vanadium: 0.00	Niobium: 0.03
Nitrogen: 0.00 (ppm)	Boron: 0.00 (ppm)	Ce(IIW) = 0.41

Pipe Contents

Content = Water

Linear Flow Rate = 0.11 m/sec Volume Flow Rate = mmscfd

Temperature = 25.00 C

Pressure = 5.00 Psig

Welding Conditions

Case: Low HI - 1er pase

Electrode Type = EXX18 Heat Input = 33.20 kJ/in

Electrode Diameter = 0.0940 in

Current = Voltage = Welding Speed =

Case: Medium HI - 1er pase

Electrode Type = EXX18 Heat Input = 39.50 kJ/in

Electrode Diameter = 0.0940 in


Current = Voltage = Welding Speed =

Case: High HI - 1er pase

Electrode Type = EXX18 Heat Input = 46.00 kJ/in

Electrode Diameter = 0.0940 in

Current = Voltage = Welding Speed =

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ANEXO C
Modelo Enfriamiento Térmico PRCI

COPIA CONTROLADA

Case: High HI - 4to pase

Electrode Type = EXX18

Heat Input = 49.00 kJ/in

Electrode Diameter = 0.0940 in

Current =

Voltage =

Welding Speed =

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Rev. 0

Documento al que pertenece: ITO.012 Soldadura de Tuberías en Servicio

Vigente desde: 04.12.2014

ANEXO C
Modelo Enfriamiento Térmico PRCI


COPIA CONTROLADA

F.E.A. Result

30/12/2012 08:26:21p.m.

Project ID: branch01b Description: PQR branch CE<0.41

Case Number	HeatInput kJ/in	Maximum Cooling Rate	Minimum Cooling Time	Maximum Inner Temperature			HAZ Hardness
		F / sec at 1000 F	t (800-500C), sec	F [C]			Hv
1	33.20	48.7	4.57	769	[409] 329.41
2	39.50	38.9	5.62	825	[441] 298.58
3	46.00	33.7	6.62	869	[465] 285.15
4	51.00	30.8	7.35	896	[480] 276.95


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Rev. 0

Documento al que pertenece: ITO.012 Soldadura de Tuberías en Servicio
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PRCI Hot Tap Analysis Input Report

30/12/2012 08:28:47p.m.

sleeve03s

PQR para sleeve temper bead

Joint Details

Pipe	Sleeve
Material = Low Carbon Steel	Material = Low Carbon Steel
Thickness = 0.3750 in	Thickness = 0.3750 in
Temperature = 26.00 C	Temperature = 26.00 C
Outer Diameter = 24.0000 in	Gap between Pipe / Sleeve = 2.4000 mm

Base Metal Chemistry

Carbon: 0.20	Manganese: 1.28	Silicon: 0.33
Nickel: 0.04	Chromium: 0.05	Molybdenum: 0.01
Copper: 0.11	Vanadium: 0.04	Niobium: 0.00
Nitrogen: 0.00 (ppm)	Boron: 0.00 (ppm)	Ce(IW) = 0.60

Pipe Contents

Content = Water

Linear Flow Rate = 0.11 m/sec Volume Flow Rate = mm³/cm³

Temperature = 26.00 C

Pressure = 5.00 Psig

Welding Conditions

Case: Low HI - 3er pase

Electrode Type = EXX18 Heat Input = 33.00 kJ/in

Electrode Diameter = 0.1250 in

Current = Voltage = Welding Speed =

Case: Medium HI - 3er pase

Electrode Type = EXX18 Heat Input = 37.60 kJ/in

Electrode Diameter = 0.1250 in


Current = Voltage = Welding Speed =

Case: High HI - 3er pase

Electrode Type = EXX18 Heat Input = 45.20 kJ/in

Electrode Diameter = 0.1250 in

Current = Voltage = Welding Speed =

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ANEXO C
Modelo Enfriamiento Térmico PRCI

COPIA CONTROLADA

Case: High HI - 4to pase

Electrode Type = EXX18

Heat Input = 49.00 kJ/in

Electrode Diameter = 0.0940 in

Current =

Voltage =

Welding Speed =

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F.E.A. Result

30/12/2012 08:03:27p.m.

Project ID: sleeve03s Description: PQR para sleeve temper bead

Case Number	HeatInput kJ/in	Maximum Cooling Rate	Minimum Cooling Time	Maximum Inner Temperature		HAZ Hardness
		F / sec at 1000 F	t (800-500C), sec	F [C]		Hv
1	33.00	67.4	3.34	785	[418]	421.91
2	37.60	59.2	4.15	818	[437]	407.47
3	45.20	44.2	5.29	862	[461]	387.82
4	49.00	39.9	5.91	886	[475]	377.60


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Rev. 0

Documento al que pertenece: ITO.012 Soldadura de Tuberías en Servicio
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PRCI Hot Tap Analysis Input Report

30/12/2012 07:55:35p.m.

sleeve02s

PQR Sleeve 02S CE<0.45 Preheat

Joint Details

Pipe	Sleeve
Material = Low Carbon Steel	Material = Low Carbon Steel
Thickness = 0.3750 in	Thickness = 0.3750 in
Temperature = 26.00 C	Temperature = 26.00 C
Outer Diameter = 24.0000 in	Gap between Pipe / Sleeve = 1.6000 mm

Base Metal Chemistry

Carbon: 0.20	Manganese: 1.28	Silicon: 0.33
Nickel: 0.04	Chrome: 0.05	Molybdenum: 0.01
Copper: 0.11	Vanadium: 0.04	Niobium: 0.00
Nitrogen: 0.00 (ppm)	Boron: 0.00 (ppm)	Ce(IIW) = 0.60

Pipe Contents

Content = Water

Linear Flow Rate = 0.11 m/sec	Volume Flow Rate = mm ³ /sec
Temperature = 26.00 C	
Pressure = 5.00 Psig	

Welding Conditions

Case: Low HI - 1er pase	
Electrode Type = EXX18	Heat Input = 32.00 kJ/in
Electrode Diameter = 0.0940 in	
Current =	Voltage = Welding Speed =
Case: Medium HI - 1er pase	
Electrode Type = EXX18	Heat Input = 38.50 kJ/in
Electrode Diameter = 0.0940 in	
Current =	Voltage = Welding Speed =
Case: High HI - 1er pase	
Electrode Type = EXX18	Heat Input = 45.16 kJ/in
Electrode Diameter = 0.0940 in	
Current =	Voltage = Welding Speed =


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F.E.A. Result

30/12/2012 07:51:13p.m.

Project ID: sleeve02s Description: PQR Sleeve 02S CE<0.45 Preheat

Case Number	HeatInput kJ/in	Maximum Cooling Rate	Minimum Cooling Time	Maximum Inner Temperature			HAZ Hardness
		F / sec at 1000 F	t (800-500C), sec	F [C]			Hv
1	32.00	67.4	3.36	750	[399]	421.55
2	38.50	52.0	4.54	797	[425]	400.45
3	45.16	42.8	5.53	836	[446]	383.82


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Rev. 0

Documento al que pertenece: ITO.012 Soldadura de Tuberías en Servicio
Vigente desde: 04.12.2014

PRCI Hot Tap Analysis Input Report

30/12/2012 07:54:58p.m.

sleeve01s

PQR para sleeve CE <0.41

Joint Details

Pipe	Sleeve
Material = Low Carbon Steel	Material = Low Carbon Steel
Thickness = 0.3750 in	Thickness = 0.3750 in
Temperature = 22.00 C	Temperature = 27.00 C
Outer Diameter = 24.0000 in	Gap between Pipe / Sleeve = 1.6000 mm

Base Metal Chemistry

Carbon:	0.15	Manganese:	1.23	Silicon:	0.23
Nickel:	0.03	Chrome:	0.04	Molybdenum:	0.00
Copper:	0.01	Vanadium:	2.00	Niobium:	0.03
Nitrogen:	0.00 (ppm)	Boron:	0.00 (ppm)	Ce(HW) =	0.81

Pipe Contents

Content = Water	
Linear Flow Rate = 0.11 m/sec	Volume Flow Rate = mmscfd
Temperature = 27.00 C	
Pressure = 5.00 Psig	

Welding Conditions

Case: Low HI - 1er pase	
Electrode Type = EXX18	Heat Input = 25.00 kJ/in
Electrode Diameter = 0.0940 in	
Current =	Voltage = Welding Speed =
Case: Medium HI - 1er pase	
Electrode Type = EXX18	Heat Input = 31.00 kJ/in
Electrode Diameter = 0.0940 in	
Current =	Voltage = Welding Speed =
Case: High HI - 1er pase	
Electrode Type = EXX18	Heat Input = 36.40 kJ/in
Electrode Diameter = 0.0940 in	
Current =	Voltage = Welding Speed =

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ANEXO C
Modelo Enfriamiento Térmico PRCI

COPIA CONTROLADA

Case: High HI - 2do pase	
Electrode Type = EXX18	Heat Input = 40.00 kJ/in
Electrode Diameter = 0.0940 in	
Current =	Voltage = Welding Speed =


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ANEXO C
Modelo Enfriamiento Térmico PRCI

COPIA CONTROLADA

F.E.A. Result

30/12/2012 07:57:10p.m.

Project ID: sleeve01s Description: PQR para sleeve CE <0.41

Case Number	HeatInput kJ/in	Maximum Cooling Rate	Minimum Cooling Time	Maximum Inner Temperature		HAZ Hardness
		F / sec at 1000 F	t (800-500C), sec	F [C]		Hv
1	25.00	101.6	2.23	684	[362]	372.31
2	31.00	71.0	3.18	739	[393]	347.05
3	36.40	57.7	4.03	774	[412]	327.47
4	40.00	50.1	4.70	800	[427]	314.12


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Vigente desde: 04.12.2014

ANEXO C
Modelo Enfriamiento Térmico PRCI

COPIA CONTROLADA

F.E.A. Result

30/12/2012 08:41:52p.m.

Project ID: branch04b Description: PQR branch 04b CE < 0.45 PHEAT

Case Number	HeatInput kJ/in	Maximum Cooling Rate	Minimum Cooling Time	Maximum Inner Temperature		HAZ Hardness
		F / sec at 1000 F	t (800-500C), sec	F [C]		Hv
1	48.10	32.2	6.97	882	[472]	361.55
2	56.00	0.0	0.00	-459	[-273]	0.00
3	63.70	25.4	9.08	926	[497]	334.33
4	28.00	59.1	3.57	724	[384]	417.78
5	34.70	44.6	4.79	794	[423]	396.26


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Rev. 0

Documento al que pertenece: ITO.012 Soldadura de Tuberías en Servicio
Vigente desde: 04.12.2014

ANEXO C
Modelo Enfriamiento Térmico PRCI


COPIA CONTROLADA

F.E.A. Result

30/12/2012 08:11:52p.m.

Project ID: sleeve03s-BO Description: PQR sleeve temper bead BOP

Case Number	HeatInput kJ/in	Maximum Cooling Rate	Minimum Cooling Time	Maximum Inner Temperature			HAZ Hardness
		F / sec at 1000 F	t (800-500C), sec	F [C]			Hv
1	15.90	116.0	1.81	762	[406]		450.71
2	17.70	98.1	2.13	809	[432]		444.40
3	26.80	63.9	3.47	964	[518]		419.54
4	31.90	54.8	4.07	1,024	[551]		408.79


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Rev. 0

Documento al que pertenece: ITO.012 Soldadura de Tuberías en Servicio
Vigente desde: 04.12.2014