

GNEE Steel (tianjin) Co., Ltd

INSPECTION REPORT

Project Ref.: 110176TND

Issued on: July 21st, 2011

Inspection Time: July 9th- 20th, 2011

P.O. No. 110176TND

QCLNG Project,Australia

Inspection
Subject:

Induction Bends

Specification:

1. Induction Bend -QCLNG-BG00-
PLE-SPE-000006_0 Rev. 4
2. Line Pipe –API 5L X70 PSL 2/
QCLNG-BG00-PLE-SPE-
000002_4
AS 2885-1
3. Bend Drawings -QCLNDG-BG00-
PLE-DET-000064_E

Inspector: Lin Gaojie

Visit Summary:

Scope of Inspection

- Induction bending.
- Preliminary inspection.
- Temper heat treatment.
- NDT.
- Bend residual magnetism.
- Visual inspection.
- Product inspection.
- Gauging pig test.
- Packaging, labels and marking inspection.
- Documents review.
- Part photo service.

Results of inspection to 110176TND Induction Bends

● Process Inspection

1. Induction bending

We had witnessed the whole manufacturing process of induction bends. They were done in accordance with the specification.

The details were in the following table.

Tag No.	IND-N1	IND-N2	IND-N3	IND-N4	IND-N5	IND-N6	IND-N7	IND-N8	IND-N16	IND-N18
Inspection*	M	M	W	M	W	W	M	M	M	W
Start-up time	7 th 5:40	11 th 2:25	11 th 11:40	8 th 23:00	10 th 21:10	9 th 15:20	9 th 2:20	11 th 4:25	11 th 0:00	9 th 17:15
Stop time	7 th 7:15	11 th 2:48	11 th 12:10	8 th 23:30	10 th 22:15	9 th 16:10	9 th 3:35	11 th 6:27	11 th 0:50	9 th 18:55

*Remark: H: Hold Point, W: Witness Point, M: Monitor, R: Review

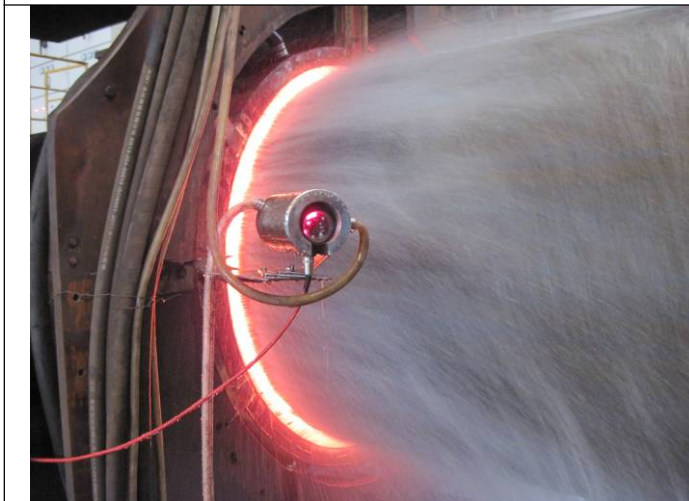
Photo attachment as below

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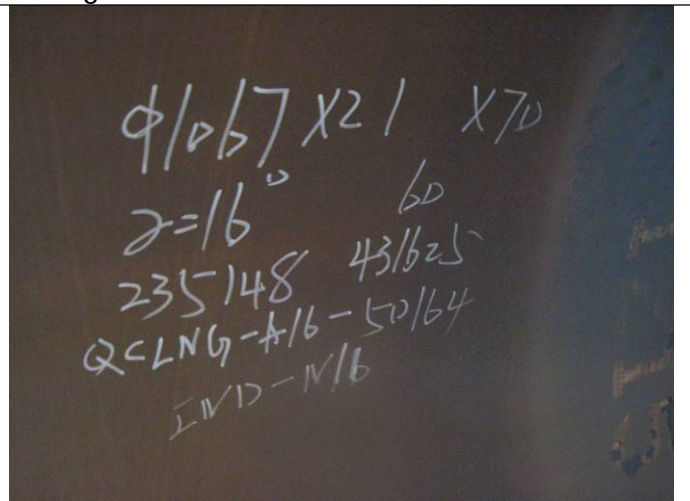
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Induction bending



Temperature pyrometer



Marking on inner surface

2. Preliminary inspection

They were qualified and there was a severe machining mark on the outer surface of IND-N18, which had been grinded and WT was qualified.
Photo attachment as below

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Bends for inspection



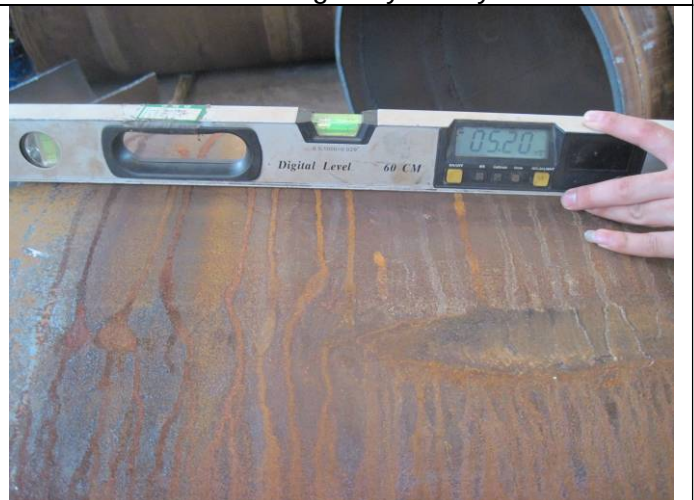
Measuring end ovality



Measuring body ovality



Measuring WT



Measuring angle

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Severe machining mark



Measuring WT after being grinded

3. Temper heat treatment

We had witnessed the temper heat treatment which was in accordance with the specification.
The process was showed in the following table.

Time Jul 12 st	9:28	10:43	11:43	12:43	13:25	17:30
Stage	Start-up	Achieving 400℃	Achieving suitable temperature Beginning holding	Finishing holding	Reducing to 400℃ Beginning air-cooling	Finishing air-cooling

Photo attachment as below



Bends in the furnace



Temper heat treatment



Temperature during holding time



Temperature beginning air-cooling

4. NDT

We had witnessed the NDT including Ultrasonic Test and Magnetic Particle Test which were in accordance with the specification. Details as below:

- 1) Bends had been abrasive blast cleaned before NDT;
- 2) The equipments used for NDT had been calibrated each shift;
- 3) The injurious anomalies on the surface had been grinded and passed the NDT.

Photo attachment as below



Bends after being abrasive blast cleaned



UT equipment 1 calibration

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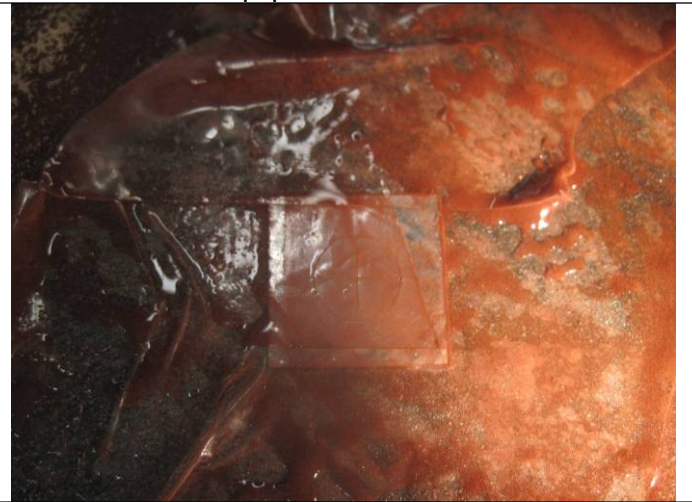
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UT equipment 2 calibration



UT equipment 3 calibration



MPT equipment calibration



Bend body UT

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Full weld UT



100mm from beveled face UT



Bend body MPT



Full weld MPT



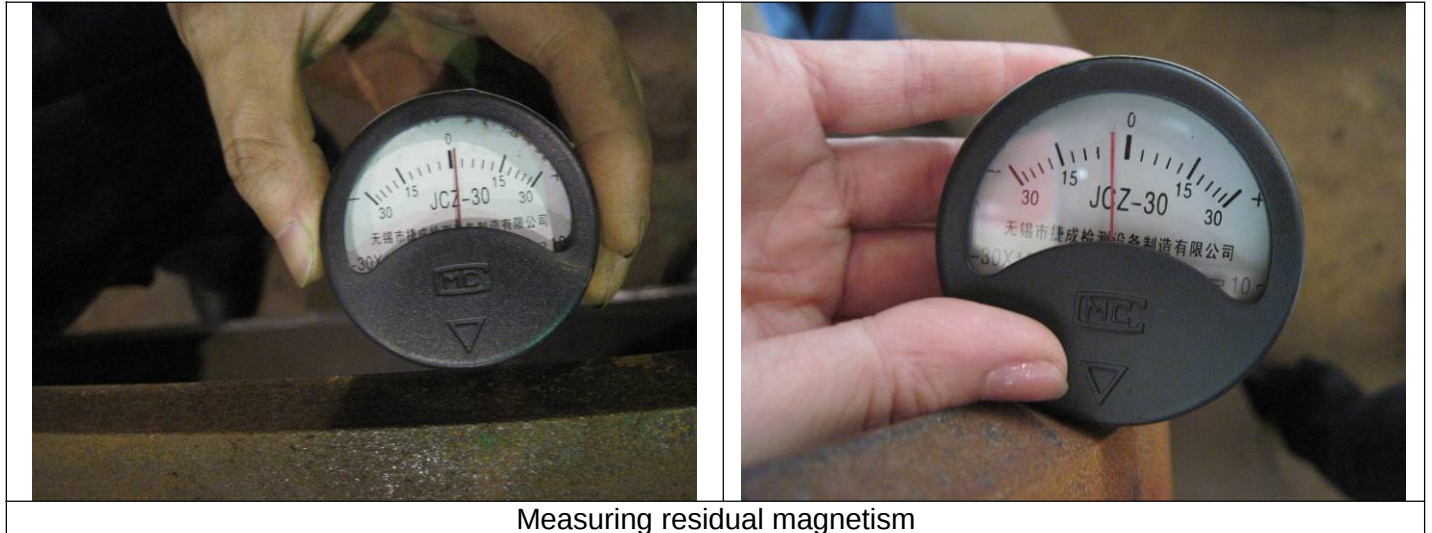
Bevel and root face MPT

5. Bend residual magnetism

We had witnessed the measuring of bend residual magnetism and they were qualified.
The detail data is in the following table.

Tag No.	IND-N1	IND-N2	IND-N3	IND-N4	IND-N5	IND-N6	IND-N7	IND-N8	IND-N16	IND-N18
Location1 (G)	2/1	3/2	2/1	1/2	1/1	1/2	1/2	2/1	1/2	1/2
Location2 (G)	1/2	2/2	2/1	2/1	1/2	1/1	2/2	1/2	1/1	2/1
Location3 (G)	1/1	1/2	3/2	3/1	3/1	2/1	3/2	1/1	2/1	1/2
Location4 (G)	2/1	2/1	1/2	1/2	2/2	1/2	1/3	2/1	1/2	1/1

Photo attachment as below



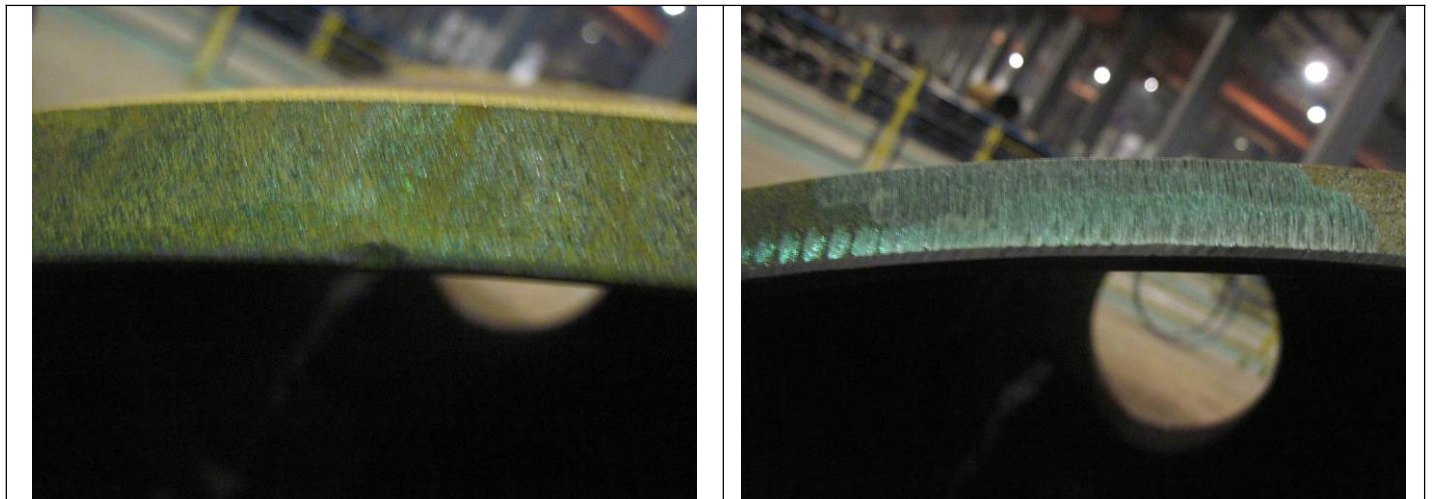
Measuring residual magnetism

6. Visual Inspection

The Bends were good and the details were as followed:

- 1) Some root faces were hurt which had been repaired;
- 2) There were some pits on the outer surface, which had been grinded and WT was qualified.

Photo attachment as below



Hurt root face	After being repaired
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7. Product inspection

The products were all qualified and the details were as followed:

1) We had witnessed the measuring WT of all bends.

The detailed data is in the following table.

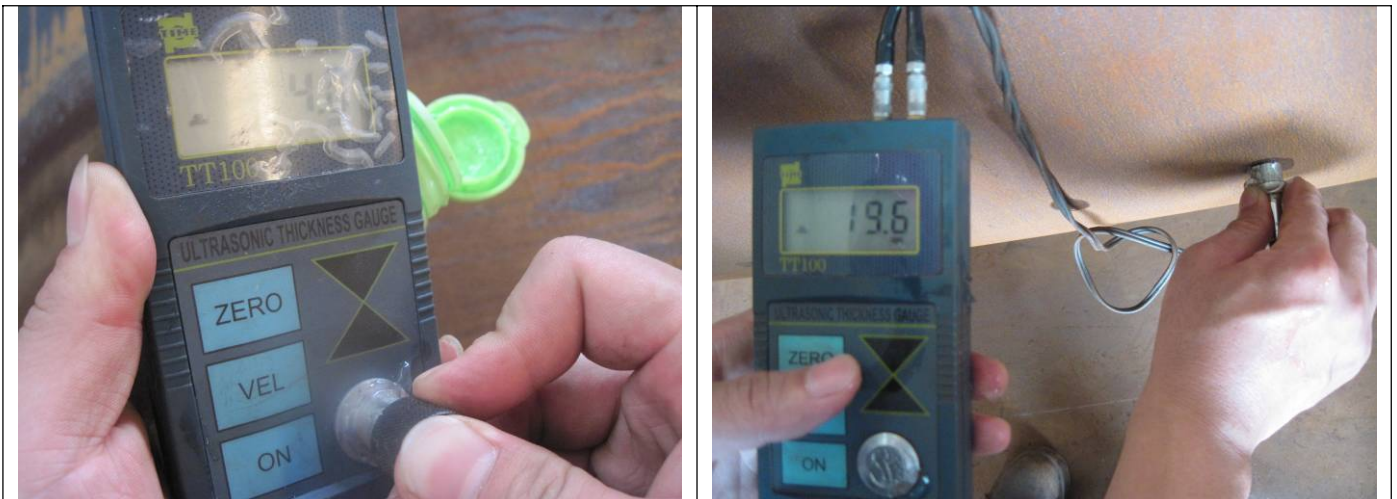
Tag No.	IND-N1	IND-N2	IND-N3	IND-N4	IND-N5	IND-N6	IND-N7	IND-N8	IND-N16	IND-N18
Extrados Min. WT /mm	19.9	19.7	19.6	19.6	19.6	19.7	19.7	19.6	19.7	19.9

2) We had witnessed the measuring dimensions of 2 bends (IND-N6&IND-N7) and reviewed the reports of other bends;

The detailed data is in the following table.

Tag No.	End ovality (%)	Body ovality (%)	Angle (deg)	Curvature radius (mm)	Out of plain (mm)	End squareness (mm)	Beveling angle (deg)		Root face (mm)	Straight tangent end (mm)	Diameter (mm)
							Inner	Outer			
IND-N6	0.47/0.47	0.56/1.03/1.12	15.8	6406	<5	2.1/2.0	19/17	31.5/31.5	1.00~1.86	520/515	1067.01 /1067.01
IND-N7	0.37/0.47	0.47/0.66/0.66	33.4	6404	<5	1.5/0.5	22/21	31/31	1.36~2.20	530/520	1067.32 /1067.32

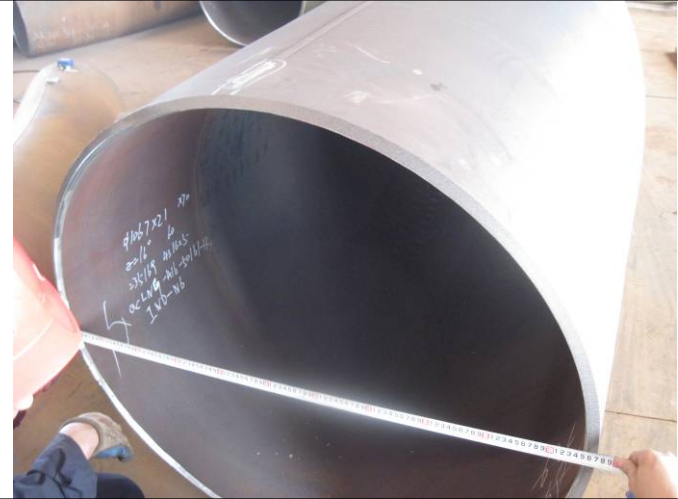
Photo attachment as below



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UT thickness calibration



Measuring WT



Measuring end ovality



Measuring body ovality



Measuring angle



Measuring out of plain

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Measuring curvature radius



Measuring end squareness



Measuring inner bevel angle



Measuring outer bevel angle



Measuring root face



Measuring straight tangent end

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Measuring diameter

8. Gauging pig test

We had witnessed gauging pig test and they were all passed. The details were as followed:

- 1) The diameter and wall thickness of gauging plate was 985mm and 3mm respectively;
- 2) The separation of two plates was 1065mm.

Photo attachment as below



Gauging pig

Measuring diameter

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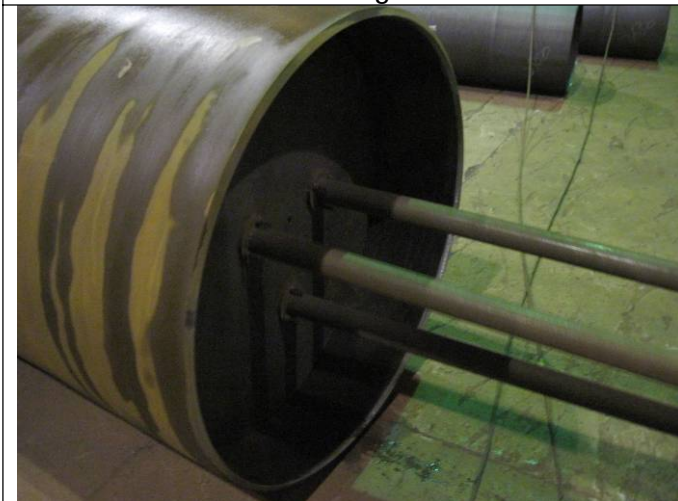
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Measuring WT



Measuring separation



Gauging pig passed through the bend

9. Packaging, labels and marking inspection

- 1) The mill had fixed end protectors on both ends of the bend;
- 2) The bends were separated by nylon rope;
- 3) The labels were right and there were 6 labels inside of each bend (3 ones each end);
- 4) The marking was right.

Photo attachment as below

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End protector and Nylon rope



Tag

10. Checking the quantity, labels, marking and polyester sling

We had checked the quantity, labels, marking and polyester sling according to the contract and Packing List. Details as below:

- 4) The quantity was right;
 - 5) The new labels were right and there were 6 labels inside of each bend(3 ones each end);
 - 6) The old polyester slings(safety factor: 6:1) had been replaced by new ones(safety factor: 8:1).
- Photo attachment as below



polyester sling Bundling

11. Verifying the truck loading

We had overseen the operation of two trucks loading and the bends were good after being loaded into the truck.

Photo attachment as below

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● **Review of Documentation**

Mother Pipe Mill Test Certificate.

Record for Production of Hot Induction Bends.

Heat Treatment Report.

UT Report.

MPT Report.

Hydrostatic Testing Report

Inspection Report of Finished product.

SGS Certificate for Polyester slings