

Inspection Order No. : IN-TJ-5602-14099
BOSS No: 1220652
Page No. : 1 of 21
Date of issue: May 10, 2014

INSPECTION REPORT
 (non-negotiable)

- **Description and Quantity of Commodity:** Ductile Iron Pipe / 1211pieces
- **Name & Address Of Buyer:** C*****
- **Name & Address Of Seller:** SHANXI SOLID INDUSTRIAL CO., LTD
- **Inspection Date & Place:** On May 06~09 2014 at Gaoping Shanxi Province China
- **sales contract No.:** DATE : April 10,2014
- **Nature Of Inspection:**

	Item	Comment
	Visual quality check	Acceptable
	Packing check	Acceptable
	Marking check	Acceptable
	Dimension check	Acceptable
	Witness test	Acceptable
	Sampling	Acceptable
- **Inspector:**  Steven Hui
- **Reviewed by**  Joanne Zhang

This is to report that we, SGS-CSTC (Tianjin) Co., Ltd. at the request of SHANXI SOLID INDUSTRIAL CO., LTD conducted the following inspection:

Instrument checklist

During the inspection, the following instrument calibration status has been checked for inspection:

No.	MEASURING INSTRUMENT DESCRIPTION	CALIBRATION STATUS	CERTIFICATE NO.
1	Coating thickness gauge (TT210/--)	2013.06.08~2014.06.07	20130608018

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2	Ultrasonic thickness gauge (--/--)	2013.06.08~2014.06.07	20130608017
3	Lining thickness gauge (TT260FN/--)	2013.06.08~2014.06.07	20130608019
3	Inside caliper (0~500MM/1016006)	2013.06.08~2014.06.07	20130608004
4	Caliper (0~500mm/SUNS-011)	2014.01.15~2015.01.14	2014011506
5	Steel tape (7.5M/----)	2014.01.15~2015.01.14	201401019
6	π ruler (50-300mm/125511)	2013.06.08~2014.06.07	20130608011
7	π ruler (300-600mm/121088)	2013.06.08~2014.06.07	20130608014
8	Universal testing machine (WES-100/13044)	2013.05.13~2014.05.12	CS201330060
9	Brinell Hardness tester (HB-3000B/120)	2013.06.08~2014.06.07	201306012
10	Caliper (0~150mm/CX)	2013.06.08~2014.06.07	20130608002
11	Pressure gauge (0~6MPa/549)	2014.04.15~2014.10.14	2014031471
12	Electric balance (FA1004/SHP02001140805)	2014.03.27~2015.03.26	201405024

Quantity of order:

Item	Description	Quantity
3922	Ductile Iron Pipe 100 mm x 6m ISO 2531:2009, C40	1,530M/255pcs
3923	Ductile Iron Pipe 200 mm x 6m ISO 2531:2009, C40	1,962M/327pcs
3830	Ductile Iron Pipe 250 mm x 6m ISO 2531:2009, C40	2,448M/408pcs
3832	Ductile Iron Pipe 350 mm x 6m ISO 2531:2009, C30	3,462M/577pcs
3833	Ductile Iron Pipe 400 mm x 6m ISO 2531:2009, C30	2,232M/372pcs
1	Ductile Iron Pipe DN 300 mm x 6m ISO 2531:2009, C30	24M/4pcs
--	Ductile Iron Pipe DN150 mm x 6m ISO 2531:2009, C30 (C40)	30M/5pcs

Declaration

The SGS inspector arrived at the manufacturer on May 06 2014 and notified the pipes of DN100, DN200, DN250, DN300 and DN150 were complete production, the pipes of DN350 and DN400 will be arrange production during the this visit. Until May. 9, 2014, SGS inspector left the manufactory, the 48pcs of DN350 and 164pcs of DN400 were finished production.

Inspection Finding:

For the finished pipe before the SGS arrived

1. Quantity check:

- ♦ Reference documents:
 - Sales contract No.: Proforma invoice No.: SFC-1401 dated April 14 2014;
- ♦ Method of quantity check
 - Quantity check by piece

Item	Description	Req. quantity	Act. quantity
3922	Ductile Iron Pipe 100 mm x 6m ISO 2531:2009, C40	1,530M/255pcs	255pcs
3923	Ductile Iron Pipe 200 mm x 6m ISO 2531:2009, C40	1,962M/327pcs	327pcs
3830	Ductile Iron Pipe 250 mm x 6m ISO 2531:2009, C40	2,448M/408pcs	408pcs
1	Ductile Iron Pipe DN 300 mm x 6m ISO 2531:2009, C30	24M/4pcs	4pcs
--	Ductile Iron Pipe DN150 mm x 6m ISO 2531:2009, C30 (C40)	30M/5pcs	5pcs

2. Visual Quality Check:

- ♦ Sample size: ANSI/ ASQ, Z1.4-2008, L-II, calculate by piece, 136pcs totally;

During the inspection, 136pcs pipes were selected randomly for visual quality inspection. The pipes were found painted with black coating on external surface and lined with gray lining on internal surface, the socket of the pipe was painted with red coating on internal surface. Surface condition of coating and lining was generally smooth. No obvious defects on the visual quality of the pipes were found.

Result: The result of visual quality was acceptable.

3. Packing check

- ♦ Sample size: ANSI/ ASQ, Z1.4-2008, L-II, calculate by piece, 136pcs totally;

The pipes were bundled by steel stripes in bundle, and stacking with wooden block between per layer pipes.

Result: The result of packing check was acceptable according to sales contract (No.: proforma invoice No.: SFC-1401 dated April 14 2014)

4. Marking check

- ♦ Sample size: ANSI/ ASQ, Z1.4-2008, L-II, calculate by piece, 136pcs totally;

During the inspection, the marking check was performed randomly and found:

- Below marking was painted near the socket:

PROYECTO CRS TURI ECUADOR
ETAPA EP
ISO2531

DN*(size) ***(class)**

******* (pipe No.)**

- Below marking was painted near the spigot:

== Zn

- Below marking was cast on the socket in D6 section for each pipe:

For the DN100, DN200 and DN250

SX14

DN* (size)DI**

For the DN150 and DN300

2014

DN* (size)DI**

Result: Except the cast marking in DN150 and DN300, the specified word content of actual marking was conformed to sales contract (No.: proforma invoice No.: SFC-1401 dated April 14 2014)

5. Dimension Check:

- Sample size: ANSI/ ASQ, Z1.4-2008, S-4, calculate by piece, 43pcs totally;

During the inspection, physical dimension check was performed by SGS inspector. D3 and D5 was measured on 2 points in cross direction, DE was calculated from actual measured value of circumference on the spigot end, e was measured on 3 random selected points along the pipe body, details were as following:

(Unit: mm)

Size		D3	D5	DE	e	Lu
DN100mm 6m C40	Req.	120.5(+1/-1)	138.9(+1/-1)	118(+1/-2.8)	Min.3.0	6000(+70/-30)
	Act.	120.1~121.1	138.49~139.19	116.9~117.3	3.9~6.5	6015~6024
DN200mm 6m C40	Req.	224.5(+1.5/-1)	245.2(+1.5/-1)	222(+1/-3.0)	Min.3.1	6000(+70/-30)
	Act.	224.2~225.6	244.62~245.64	219.7~220.8	4.8~7.1	6002~6009
DN250mm 6m C40	Req.	276.5(+1.5/-1)	296.9 (+1.5/-1)	274 (+1/-3.1)	Min. 3.9	6000(+70/-30)
	Act.	275.8~277.4	296.78~297.97	272.0~273.1	5.2~7.7	6006~6010
DN 300mm 6m C30	Req.	328.5 (+1.8/-1)	351.7 (+1.8/-1)	326 (+1/-3.3)	Min. 4.6	6000(+70/-30)
	Act.	328.7~330	351.64~352.52	323.5~323.1	6.3~8.9	6008~6015
DN150mm 6m C30 (C40)	Req.	172.5(+1/-1)	190.6(+1/-1)	170(+1/-2.9)	Min.3.0	6000(+70/-30)
	Act.	172.6~173.0	190.34~190.93	168.5~168.7	5.5~10.3	6024~6026

Applied standard: ISO 2531: 2009 for DE, e & Lu; GB/T 13295-2008 for D3 & D5

Result: The result of dimension check was acceptable.

6. Witness testing randomly:

6.1 Thickness of lining check:

- Sample size: ANSI/ ASQ, Z1.4-2008, S-4, calculate by piece, 43pcs totally;

During the inspection, 43pcs pipe were selected randomly for thickness of cement lining check, thickness of cement lining check was applied at the section from both pipe ends at least 200mm, measurements were taken at four points spaced at 90° intervals, details were as follows:

Size		Min. thickness of cement lining at one point (mm)
DN100mm 6m C40	Required value	Min 2
	Actual value	2.72~4.81
DN200mm 6m C40	Required value	Min 2
	Actual value	2.52~4.31
DN250mm 6m C40	Required value	Min 2
	Actual value	2.51~5.04
DN 300mm 6m C30	Required value	Min 2
	Actual value	2.81~4.50
DN150mm 6m C30 (C40)	Required value	Min 2
	Actual value	3.65~4.26

Applied standard: ISO 4179:2005

6.2 Thickness of external coating checks:

- Sample size: ANSI/ ASQ, Z1.4-2008, S-4, calculate by piece, 43pcs totally;

During the inspection, 40pcs pipe were selected randomly for thickness of bitumen coating check; thickness of bitumen coating check was applied on three different points in each random selected pipe, details were as following:

Size	Thickness of external coating	
DN100mm 6m C40	Required value	$\geq 70\mu\text{m}$
	Actual value	141~299 μm
DN200mm 6m C40	Required value	$\geq 70\mu\text{m}$
	Actual value	116~204 μm
DN250mm 6m C40	Required value	$\geq 70\mu\text{m}$
	Actual value	130~264
DN 300mm 6m C30	Required value	$\geq 70\mu\text{m}$
	Actual value	115~214
DN150mm 6m C30 (C40)	Required value	$\geq 70\mu\text{m}$
	Actual value	110~243

Applied standard: ISO 8179: 1995 and sales contract (No.: proforma invoice No.: SFC-1401 dated April 14 2014)

Remark: Above actual value, which was checked by coating thickness detector, covered total external coating thickness: Zinc coating + Bitumen coating.

6.3 Witness mechanical property test in manufacturer's lab:

- Sample size: 1pcs per size

During the inspection, mechanical property test on offered samples was performed by manufacturer under the witness of SGS inspector, details were as follows:

Size		Tensile Strength(MPa) Min.420	Elongation (%) Min.10	Hardness(HB) Max.230
DN100mm 6m C40	Act. Value	465.6	14.29	177
DN200mm 6m C40		469.8	15.43	170
DN250mm 6m C40		462.5	15.49	172
DN 300mm 6m C30		480.2	14.97	177
DN150mm 6m C40		468.8	14.86	171

Applied standard: ISO2531: 2009

Result: The result of witness testing was acceptable.

- Standard witnessing/observing disclaimer (voluntary witnessing)

In accordance with Client's instructions, the Company's involvement has been limited to witnessing/observing a third party's intervention(s) at the third party's laboratory/test house or other facilities and installations used for the intervention(s). The Company's sole responsibility was to be present at the time of the third party's intervention(s) to forward the results, or confirm the occurrence, of the intervention(s). The Company is not responsible for the condition or calibration of apparatus, instruments and measuring devices used, the analysis methods applied the qualifications, actions or omissions of the third party's personnel or the analysis results.

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7. Sampling:

- Sample size: according to the client's requirement, 1 piece for every size, 3 pcs totally;

During the inspection, the sampling pipes were selected randomly and cut the sample, totally 3 pcs sample was cut and sent to the SGS lab. The sampling pipe No. was as following:

- 1# / DN100: 140430-155-15-B1
- 2# / DN200: 140502-246-13-C3
- 3# / DN250: 140424-198-C3

7.1. Test item: Tensile test

Test method: EN ISO 6892-1:2009

Test item	Specimen type	Tensile strength (R _m) (MPa)	Elongation after fracture(A) L ₀ =5d, (%)	Conclusion
Req.	-----	≥ 420	≥ 10	-----
1#	Round specimen	454	14.5	Pass
2#	Round specimen	437	14.0	Pass
3#	Round specimen	444	13.5	Pass

Note: The requirement is specified in ISO 2531-2009(E) (Table 8) Type Pipes centrifugally cast

7.2. Test item: Hardness test

Test method: ISO 6506.1-2005

Test item.	Sample No	Result			Req.	Conclusion
HBW5/750	1#	167	167	167	Max.230	Pass
	2#	166	163	163		Pass
	3#	163	163	163		Pass

Note: The requirement is specified in ISO 2531-2009(E) -4.3.2 centrifugally cast pipes

Lab test for hardness test and mechanical properties (tensile strength, yield strength and elongation) test as per ISO 2531-2009 was performed at SGS lab, the description of test was referred to the SGS lab test report (report number: TM1405297 Dated: May.26, 2014).

Result: The result was conformed to ISO 2531-2009.

For the on producing pipe during the visit

1. Quantity check:

- ♦ Reference documents:
 - Sales contract No.: proforma invoice No.: SFC-1401 dated April 14 2014;
- ♦ Method of quantity check
 - Quantity check by piece

Item	Description	Req. quantity	Finished quantity during the visit
3832	Ductile Iron Pipe 350 mm x 6m ISO 2531:2009,C30	3,462M/577pcs	48pcs
3833	Ductile Iron Pipe 400 mm x 6m ISO 2531:2009,C30	2,232M/372pcs	164pcs

Result: The manufacturer declared that all pipe will be finished on the May 12 2014.

2. Visual Quality Check:

- ♦ Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

During the inspection, 22pcs pipes were selected randomly for visual quality inspection. The pipes were found painted with black coating on external surface and lined with gray lining on internal surface, the socket of the pipe was painted with red coating on internal surface. Surface condition of coating and lining was generally smooth. No obvious defects on the visual quality of the pipes were found.

Result: The result of visual quality was acceptable.

3. Packing check

- ♦ Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

The pipes were on nude package condition.

Result: The result of packing check was acceptable according to sales contract (No.: proforma invoice No.: SFC-1401 dated April 14 2014)

4. Marking check

- ♦ Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

During the inspection, the marking check was performed randomly and found:

- Below marking was painted near the socket:

**PROYECTO CRS TURI ECUADOR
ETAPA EP
ISO2531**

DN*** (size) *** (class)
 ***** (pipe No.)

- Below marking was painted near the spigot:

== Zn

- Below marking was cast on the socket in D6 section for each pipe:

SX14

DN*** (size) DI

Result: The specified word content of actual marking was conformed to sales contract (No.: proforma invoice No.: SFC-1401 dated April 14 2014)

5. Dimension Check:

- Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

During the inspection, physical dimension check was performed by SGS inspector. D3 and D5 was measured on 2 points in cross direction, DE was calculated from actual measured value of circumference on the spigot end, e was measured on 3 random selected points along the pipe body, details were as following:

(Unit: mm)

Size		D3	D5	DE	e	Lu
DN350mm 6m C30	Req.	380.5(+1.8/-1)	403.4(+1.8/-1)	383.8 (+1/-3.4)	Min. 4.7	6000(+70/-30)
	Act.	380.6~390.1	403.28~403.88	381.9~383.4	5.6~9.4	5994~6010
DN400mm 6m C30	Req.	431.5(+2.1/-1)	457.2(+2.1/-1)	429 (+1/-3.5)	Min. 4.8	6000(+70/-30)
	Act.	431.8~432.8	457.21~458.07	426.3~427.7	5.9~10.1	5985~6009

Applied standard: ISO 2531: 2009 for DE, e & Lu; GB/T 13295-2008 for D3 & D5

Result: The result of dimension check was acceptable.

6. Witness testing randomly:

6.1 Thickness of lining check:

- Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

During the inspection, 22pcs pipe were selected randomly for thickness of cement lining check, thickness of cement lining check was applied at the section from both pipe ends at least 200mm, measurements were taken at four points spaced at 90° intervals, details were as follows:

Size		Min. thickness of cement lining at one point (mm)
DN350mm 6m C30	Required value	Min 3
	Actual value	3.2~5.09
DN400mm 6m C30	Required value	Min 3
	Actual value	3.08~4.74

Applied standard: ISO 4179:2005

6.2 Thickness of external coating checks:

- Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

During the inspection, 22pcs pipe were selected randomly for thickness of bitumen coating check; thickness of bitumen coating check was applied on three different points in each random selected pipe, details were as following:

Size		Thickness of external coating
DN350mm 6m C30	Required value	$\geq 70\mu\text{m}$
	Actual value	101~201 μm
DN400mm 6m C30	Required value	$\geq 70\mu\text{m}$
	Actual value	94.9~221 μm

Applied standard: ISO 8179: 1995 and sales contract (No.: proforma invoice No.: SFC-1401 dated April 14 2014)

Remark: Above actual value, which was checked by coating thickness detector, covered total external coating thickness: Zinc coating + Bitumen coating.

6.3 Witness hydrostatic test randomly:

- Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

During inspection, 22pcs pipes were selected randomly for hydrostatic test online under witness of SGS-CSTC inspector, details were as follows.

Size		Test pressure (Mpa)	Duration (s)
DN350mm 6m C30	Required value	≥ 3.0	≥ 10
	Actual value	3.6	10s
DN400mm 6m C30	Required value	≥ 3.0	≥ 10
	Actual value	3.6	17s

Applied standard: ISO 2531: 2009

Result: During the test, no visible leakage, sweating or any other sign of failure was found, the result of witness hydrostatic test was acceptable.

6.4 Witness mass of zinc coating check randomly:

- Sample size: according to client requirement, 10% per quantity presented during inspection, 22pcs totally;

During inspection, 22pcs pipes were selected randomly for mass of zinc coating check under witness of SGS-CSTC inspector, details were as follows:

Size		Mass of zinc coating
DN350mm 6m C30	Required value	$\geq 200\text{g/m}^2$
	Actual value	225~282

DN400mm 6m C30	Required value	$\geq 200\text{g/m}^2$
	Actual value	213~258

Applied standard: ISO 8179-1:2004 and sales contract (No.: proforma invoice No.: SFC-1401 dated April 14 2014)

6.5 Witness mechanical property test in manufacturer's lab:

- Sample size: 1pcs per size

During the inspection, mechanical property test on offered samples was performed by manufacturer under the witness of SGS inspector, details were as follows:

Size	Pipe No.		Tensile Strength(MPa)	Elongation (%)	Hardness(HB)
			Min.420	Min.10	Max.230
DN350mm 6m C30	140508AB-07	Act.	465.2	13.71	174
DN400mm 6m C30	140507AC-01	Value	456.9	16.99	170

Applied standard: ISO2531: 2009

Result: The result of witness testing was acceptable.

- Standard witnessing/observing disclaimer (voluntary witnessing)

In accordance with Client's instructions, the Company's involvement has been limited to witnessing/observing a third party's intervention(s) at the third party's laboratory/test house or other facilities and installations used for the intervention(s). The Company's sole responsibility was to be present at the time of the third party's intervention(s) to forward the results, or confirm the occurrence, of the intervention(s). The Company is not responsible for the condition or calibration of apparatus, instruments and measuring devices used, the analysis methods applied the qualifications, actions or omissions of the third party's personnel or the analysis results.

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7. Sampling:

- Sample size: according to the client's requirement, 1piece for every size

During the inspection, the sampling pipes were selected randomly and cut the sample, totally 2pcs sample was cute and sent to the SGS lab. The sampling pipe No. was as following:

4# / DN350: 0508AB-61-8

5# / DN400: 0507AC-113-11

7.1. Test item: Tensile test

Test method: EN ISO 6892-1:2009

Test item	Specimen type	Tensile strength (R _m) (MPa)	Elongation after fracture(A) L _o =5d, (%)	Conclusion
Req.	-----	≥ 420	≥ 10	-----
4#	Round specimen	420	10.0	Pass
5#	Round specimen	442	12.0	Pass

Note: The requirement is specified in ISO 2531-2009(E) (Table 8) Type Pipes centrifugally cast

7.2. Test item: Hardness test
 Test method: ISO 6506.1-2005

Test item.	Sample No	Result			Req.	Conclusion
HBW5/750	4#	167	166	167	Max.230	Pass
	5#	161	163	163		Pass

Note: The requirement is specified in ISO 2531-2009(E) -4.3.2 centrifugally cast pipes

Lab test for hardness test and mechanical properties (tensile strength, yield strength and elongation) test as per ISO 2531-2009 was performed at SGS lab, the description of test was referred to the SGS lab test report (report number: TM1405297 Dated: May.26, 2014).

Result: The result was conformed to ISO 2531-2009.

8. Photo taken during the production







Based on client's requirement, photo were taken during the production, the details were as attachment.

THIS REPORT ONLY REFLECTED OUR ACTUAL FINDINGS. THE INSPECTION WAS DONE TO THE BEST OF OUR KNOWLEDGE AND ABILITY AND WITH DUE CARE. THE FINDINGS ARE VALID AS FOR TIME AND PLACE OF INSPECTION.

Attachment: Photos during inspection

For the finished pipe before the SGS arrived



	
<p>visual quality check</p>	
	
<p>Packing check</p>	<p>Marking check</p>
	
<p>Marking check</p>	



Marking check



Marking check



Dimension check



Dimension check

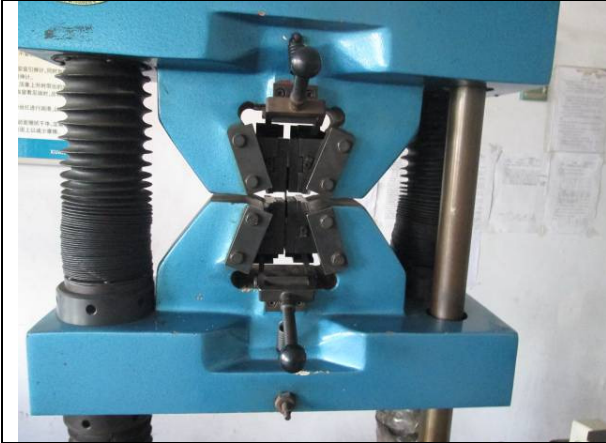


Dimension check



Dimension check





Witness tensile test



Witness hardness test



Sampling



Sample

For the on producing pipe during the visit



Socket mould



Socket mold marking



Centrifugal casting



Centrifugal casting



Aneling



Aneling



Witness zinc coating check



Witness zinc coating check



Zinc coating sprayed



Witness zinc coating check



Pipe after Zinc coating



Hydrostatic test



Hydrostatic test



Lining



Pipe after lining



Cement nutritious



Coating



Make marking



Sampling



Sample



Witness test



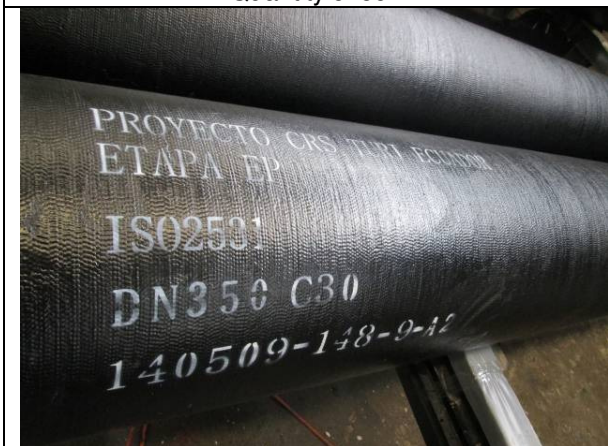
Witness test



Quantity check



Visual quality



Marking check



Marking check



Marking check



Marking check



Dimension check



Dimension check



Dimension check



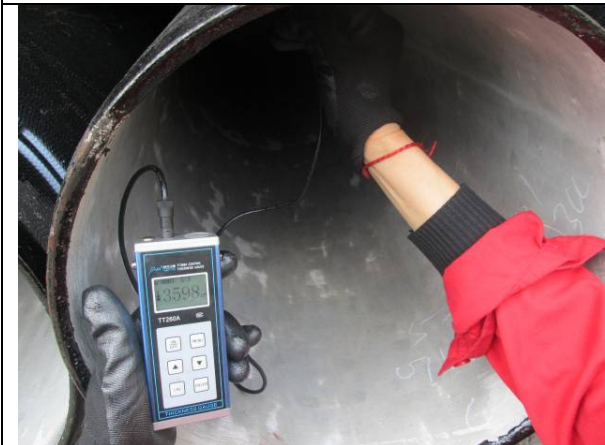
Dimension check



Dimension check



Coating check



Cement lining check



Express No.

End of report

FOR AND ON BEHALF OF
SGS-CSTC STANDARDS
TECHNICAL SERVICES CO., LTD.

AUTHORIZED SIGNATURE