

**Inspection Certificate (EN 10204-3.2)**

Inspection No.: IN-TJ-5805-16071  
 Certificate No.: IN-TJ-5805-16071

Customer: (VAT No.9600823/ Order No.: HNSCPWX16265DL  
 Reg No. J28/215/1997)  
 Address: Date: Sep. 21st, 2016  
 Manufacturer: Changsha Hunan Steel Co.,LTD. Works No. N/A  
 Address: Hunan Steel Industrial Zone,  
 Furong Special District, Changsha City,  
 Hunan, China

Article: LSAW STEEL COATED PIPES

Technical specification/Requirements: API 5L 45<sup>th</sup> /ISO3813 PSL2

Material: L360N Pipe Standard: API 5L 45th / ISO3813  
 PSL2  
 Coated Standard: 3LPE/DIN30670: 2012  
 State of Delivery: Normalizing Melting Process: N/A  
 Typical Marking: N/A Brand of the manufacture: N/A  
 Inspector's stamp: TJ1855 & TJ1359

Extent of material delivery:

Item No.	Number of pieces	Article	Batch No. (Heat No)	Remarks (Test No.)
1	150	LSAW steel coated pipes ( Ø609.6x11x12000mm )	15204215	1#~3#
2	150	LSAW steel coated pipes ( Ø609.6x11x12000 mm)	15303765	4#~6#
3	120	LSAW steel coated pipes ( Ø609.6x11x12000 mm)	15104011	7#~9#
4	60	LSAW steel coated pipes ( Ø609.6x11x12000 mm)	15104012	10#~11#
5	115	LSAW steel coated pipes ( Ø609.6x11x12000 mm)	15104010	12#~14#
6	72	LSAW steel coated pipes ( Ø609.6x11x12000 mm)	15104013	15#~16#

The requirements are fulfilled as per annex:

Certification Body: SGS

Location and Date: In Cangzhou City, Hebei Province, China on Nov.09-15, 17, 20-21, 2016

Annexis: Test results, other annexis

Inspector: Jane Wang & Lucky Liu

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Test results: Acceptable according to API 5L 45<sup>th</sup> /ISO3183 PSL2 & 3LPE/ DIN30670: 2012  
 Annex: For IN-TJ-5805-16071

**Mechanical tests**

Test type: Specimen type: Straps State of delivery: Normalizing										1 = Energy of impact [ J ] 2 = Impact strength [ J/cm <sup>2</sup> ] 3 = Cryst. Proportion [ % ] 4 = Expansion [ mm.10 <sup>-2</sup> ] 5 = Expansion [ % ] 6 = Hardness [ HB ]					
Test No.	Dim. of specimen		Specimen			Test temp.	Yield strength	Tensile strength	Elongation	Red. of area	Values (at 0°C)				Remark
	Ø (mm)	Thick (mm)				°C	R <sub>p</sub> (MPa)	R <sub>m</sub> (MPa)	A L <sub>o</sub> =50 (%)	Z (%)	1	2	3	Σ /n	
1-B	/	11				20	410	514	45	/	1	152	173	142	
1-W	/	11				20	/	522	/	/	1	97	70	55	
1-H	/	/				/	/	/	/	/	1	140	147	148	
3-B	/	11				20	412	520	44	/	/	/	/	/	
3-W	/	11				20	/	526	/	/	/	/	/	/	
4-B	/	11				20	389	510	46	/	1	160	165	171	
4-W	/	11				20	/	534	/	/	1	81	79	90	
4-H	/	/				/	/	/	/	/	1	152	144	147	
6-B	/	11				20	408	515	45	/	1	/	/	/	
6-W	/	11				20	/	521	/	/	1	/	/	/	
7-B	/	11				20	386	516	48	/	1	155	151	147	
7-W	/	11				20	/	537	/	/	1	55	61	65	
7-H	/	/				/	/	/	/	/	1	157	162	167	
9-B	/	11				20	400	519	47	/	1	/	/	/	
9-W	/	11				20	/	530	/	/	1	/	/	/	
10-B	/	11				20	417	523	46	/	1	175	190	165	
10-W	/	11				20	/	553	/	/	1	101	103	98	
10-H	/	/				/	/	/	/	/	1	135	131	142	
12-B	/	11				20	407	521	45	/	1	165	180	185	
12-W	/	11				20	/	547	/	/	1	100	115	116	
12-H	/	/				/	/	/	/	/	1	145	150	144	
14-B	/	11				20	400	523	44	/	1	/	/	/	
14-W	/	11				20	/	532	/	/	1	/	/	/	
15-B	/	11				20	400	516	48	/	1	235	153	203	
15-W	/	11				20	/	544	/	/	1	117	117	110	
15-H	/	/				/	/	/	/	/	1	158	167	147	
							-Blank-								

Note: 1) B- Base metal, W- Weld, H- Heat affected zone  
 2) Size of impact specimen was 7.5x10x55mm.

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**Guided-bend test**

Test No.	Specimen width	Bending Angle	Requirements	Results
1-W	38mm	180 °	the test pieces shall not a) fracture completely, b) reveal any cracks or ruptures in the weld metal longer than 3,2 mm, regardless of depth, or c) reveal any cracks or ruptures in the parent metal, HAZ or fusion line longer than 3,2 mm or deeper than 12,5 % of the specified wall thickness.	No Crack
2-W	38mm	180 °		No Crack
3-W	38mm	180 °		No Crack
4-W	38mm	180 °		No Crack
5-W	38mm	180 °		No Crack
6-W	38mm	180 °		No Crack
7-W	38mm	180 °		No Crack
8-W	38mm	180 °		No Crack
9-W	38mm	180 °		No Crack
10-W	38mm	180 °		No Crack
11-W	38mm	180 °		No Crack
12-W	38mm	180 °		No Crack
13-W	38mm	180 °		No Crack
14-W	38mm	180 °		No Crack
15-W	38mm	180 °		No Crack
16-W	38mm	180 °		No Crack

Note: W- Weld.

**Chemical analysis (%)**

Test No.	C	Si	Mn	P	S	Cr	Ni
15204215	0.06	0.11	1.06	0.015	0.004	0.014	0.023
	0.06	0.11	1.06	0.015	0.005	0.014	0.024
15303765	0.06	0.10	1.03	0.013	0.005	0.001	0.021
	0.06	0.10	1.04	0.014	0.005	0.001	0.020
15104011	0.07	0.12	1.07	0.017	0.006	0.015	0.027
	0.06	0.12	1.07	0.017	0.005	0.014	0.026
15104012	0.06	0.11	1.07	0.013	0.004	0.014	0.026
	0.06	0.11	1.07	0.014	0.004	0.012	0.024
15104010	0.06	0.11	1.08	0.014	0.004	0.014	0.025
	0.06	0.12	1.08	0.014	0.004	0.016	0.027
15104013	0.06	0.16	1.22	0.016	0.002	0.018	0.031
	0.06	0.15	1.20	0.016	0.003	0.014	0.028
Test No.	Mo	Cu	V	Nb	Ti	B	CE
15204215	0.009	0.010	0.001	0.018	0.012	0.0004	0.12
	0.009	0.010	0.001	0.018	0.012	0.00045	0.12
15303765	0.002	0.017	0.0001	0.018	0.011	0.0005	0.12
	0.001	0.016	0.0001	0.018	0.010	0.0005	0.12
15104011	0.013	0.021	0.0001	0.018	0.010	0.0004	0.13
	0.009	0.020	0.0001	0.017	0.010	0.00055	0.12
15104012	0.011	0.020	0.0001	0.019	0.013	0.0004	0.12
	0.005	0.018	0.0001	0.018	0.012	0.00045	0.12
15104010	0.009	0.020	0.0001	0.019	0.013	0.0005	0.12
	0.014	0.020	0.0001	0.020	0.014	0.00045	0.12

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15104013	0.037	0.026	0.002	0.021	0.017	0.00055	0.13
	0.027	0.026	0.0001	0.019	0.015	0.0005	0.13

Note: 1) Nb + V + Ti ≤ 0.15 %

2) Ce=C+Si/30+Mn/20+Cu/20+Ni/60+Cr/20+Mo/15+V/10+5B

**Hydrostatic Test Randomly**

Size	/	Test pressure (Mpa)	Duration (s)
Ø609.6x11	Required value	11.69	≥10
	Actual value	11.7	10

Note: During the test, no visible leakage, sweating or any other sign of failure was found.

**Dimension Check Randomly**

Size (mm)	/	O.D (mm)	Length (mm)	Wall thickness (mm)	End angle(°)	Root Face (mm)
Ø609.6x11	Req. value	609.6 ±1.6	12000 ±30	11 ±0.88	30~35	1.6 ±0.8
	Act. value	609~610	11992~11997	10.33~10.48	31~32	1.3~1.5

**Coating Thickness Check Randomly**

Size (mm)	/	Coating thickness (mm)	Coating thickness on weld area (mm)
Ø609.6x11	Req. value	Min 2.5	Min 2.1
	Act. value	2.5~3.1	2.1~2.8

**Bond Strength Check Randomly**

Size (mm)	/	Bond strength check N/mm (at 23°C)	Bond strength check N/mm (at 50°C)
Ø609.6x11	Req. value	Min 200N	Min 40N
	Act. value	210N	50N

**Indentation Resistance Test Randomly**

No.	Pipe number	Loading mass	Indentation resistance test			
			Req. (23 °C)	Act. (23 °C)	Req. (50 °C)	Act. (50 °C)
1	LSAW141	2.5kg	≤0.2mm	0.11mm	≤0.3mm	0.21mm
2	LSAW360	2.5kg	≤0.2mm	0.11mm	≤0.3mm	0.20mm

**Continuity Test Randomly**

Size (mm)	Test voltage	Result of continuity test
Ø609.6x11	25kV	No leakage was found

**Visual Inspection Randomly:** The result was acceptable.

**NDT(X-Ray & UT) Test Check Randomly:** The result was acceptable.

**Metallographic Test Check Randomly:** The result was acceptable.

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