

2/9.1mm x 5.6mm

INSPECTION CERTIFICATE

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RESUBMITTAL DATE FOR STATUS B	RESUBMITTAL DATE FOR STATUS C
SIGN: 	DATE SIGNED: Aug 27, 2018
VDDR CODE(S): RM13	
AUTHORIZATION TO PROCEED DOES NOT WAIVE SUPPLIER'S RESPONSIBILITY OR LIABILITY UNDER THE CONTRACT/PURCHASE ORDER FOR COMPLIANCE WITH THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS	

Date : Feb. 08, 2018
CERTIFICATE No. : 180227-0140-4
Specification : CSA Z245.1 Gr.359 CAT II

 **HUSTEEL Co., Ltd.**

INSPECTION CERTIFICATE



주식회사 휴스틸

HEAD OFFICE SHINAN B/D 15F 943-19, DAECHI-DONG,

KANGNAM-GU, SEOUL, KOREA

DANGJIN PLANT 131-BUGOKGONGDAN STREET, SONGAK-EUP,

DANGJIN-SI, CHUNGHEONGNAM-DO, KOREA

P/O No. : S71G 333755
L/C No. :

ISSUED DATE : 2018. 02. 27

COMMODITY : ERW STEEL PIPE

SPECIFICATION : CSA Z245.1-14 Gr.359 CAT II M45C,

Sour service

CERTIFICATE No. : 180227-0140-4

MANUFACTURED No. : 18-02-025-0

SUPPLIER : HUSTEEL CO., LTD.

CUSTOMER : MRC Global(CANADA) ULC

CHEMICAL COMPOSITION

NO.	HEAT NO Pipe No	QTY	TYPE	NOMINAL SIZE		O.D		W.T		LENGTH		kg/m	TPA(*5)					DIV	weight (%)											CE											
				PCS	*1	mm	mm	mm	mm	TS	YS		EL	YR	MPa	%	C		Si	Mn	P	S	Cu	Ni	Cr	Mo	V	Nb	Ti		B										
																																TWA					weight (%)				
																																TS	YS	EL	YR	MPa	C	Si	Mn	P	S
01	SQ5B211 1	342	BPEB	8	219.1	5.6	18,000	29.48	510	460	32	90	535	H	0.03	0.15	0.89	0.005	0.001	0.113	0.119	0.107	0.0030	0.0020	0.0400	0.0104	0.0001														
	SQ5B211 201		BPEB	8	219.1	5.6	18,000	29.48	512	459	35	90	529	P	0.03	0.17	0.91	0.005	0.001	0.125	0.117	0.103	0.0011	0.0019	0.0424	0.0100	0.0001														
	SQ5B209 350	387	BPEB	8	219.1	5.6	18,000	29.48	517	469	32	91	514	H	0.04	0.16	0.87	0.005	0.001	0.115	0.119	0.107	0.0020	0.0020	0.0040	0.0096	0.0001														
														P	0.03	0.17	0.89	0.005	0.001	0.123	0.118	0.102	0.0010	0.0020	0.0416	0.0099	0.0001														
																											0.140														

NO.	HYDROSTATIC TEST		HEAT TREATMENT	DROP WEIGHT TEAR TEST (Shear Area)	HARDNESS TEST		IMPACT TEST (-45 °C)		8 N-D-T (U.T)	FLATTENING OR BEND TEST	VISUAL & DIMENSION	METALLOGRAPHIC TEST	RESIDUAL MAGNETISM		
	T.P	H.T RESULT			HRC	HV 500gf	DIW #5	Energy (Ind, J)						Shear area %	SIZE
01	13.8	#7	GOOD	%	4.1 %	500g							GOOD		

01	13.8	5	GOOD	950		11.7	183	37/49/49	-	E								
								53/54/55	100.0									
	13.8	5	GOOD	950				53/51/55	-	E								
								56/54/65	100.0									
	13.8	5	GOOD	950		11.7	171	53/55/36	-	E								
								63/66/57	100.0									

* Sour service means that pipes meet CSA clause 16 except for HIC test

* 17.2.b Charpy Test specimen are flattened.

* CE = $C + F(Mn/6 + Si/24 + Cu/15 + Ni/20 + (Cr + Mo + V + Nb)/5 + 5B)$

Latest edition per CSA Z245.1 (2014)

*2. O.D : Outside Diameter, W.T : Wall Thickness

*3. Tensile Test - TS : Tensile Strength, YS : Yield Strength, EL : Elongation, YR : Yield Ratio, Gauge Length : 2 inch, Y.P method : 0.5% Underload

*4. H : Heat analysis, P : Product analysis

*5. TPA : Transverse pipe axis, LPA : Longitudinal pipe axis, TWA : Transverse weld axis

*6. Specimen Size - A : 10x10mm, B : 10x7.5mm, C : 10x6.7mm, D : 10x5.0mm, E : 10x3.3mm

*7. T.P : Testing Pressure, H.T : Holding Time *8. NDT : UT, 1/16" Drilled Hole or NS Notch / 6.4mm(Ø) x 1/2(Depth) = FBH / 8mm(w) x 15mm(L) x 1/2(Depth) = FBH

WE HEREBY CERTIFY THAT THE MATERIAL HEREIN HAS BEEN MADE IN ACCORDANCE WITH THE ORDER AND ABOVE SPECIFICATION
THIS CERTIFICATE IS ISSUED ACCORDING TO EN 10204 3.1(ISO 10474 3.1)

Haec Gyn . Kim

SURVEYOR

MANAGER OF QA TEAM

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INSPECTION CERTIFICATE

주식회사 휴스

HUSTEEL Co., Ltd.

HEAD OFFICE SHINAN B/D 15F, 943-19, DAECHEI-DONG,

KANGNAM-GU, SEOUL, KOREA

DANGJIN PLANT 131,BUGOKGONGDAN STREET,SONGAK-EUP,

DANGJIN-SI, CHUNGCHONGNAM-DO, KOREA

P/O No.	:	S71G 333755
L/C No.	:	

ISSUED DATE : 2018.02.27

COMMODITY : E.R.W STEEL PIPE

CSA 7245 1-14 CATHODIC PROTECTION SYSTEMS

NOTIFICATION

CERTIFICATE No. : 180277-0140-4

MANUFACTURED No. 18-02-025-0

SUPPLIER : HUITEEL CO LTD

CUSTOMER : MDC CLOTHING CANADA LTD.

[illegible]

Diameter: 219.1 mm Specification: CSA Z245.1 GR-359 CAT II									
Grade: Gr.359 CAT II M45C, S5									
Heat No	Pipe No	Product ID	Test Type			Orientation			Y/T
			Wg(%)	C	S	Mn	P	S	
SQ50211	1	HRA139510	MILL CONTROL						
			MILL CONTROL						
			MILL CONTROL						
SQ50209	201	HRA139520	MILL CONTROL						
			MILL CONTROL						
			MILL CONTROL						
SQ50217	350	HRA139650	MILL CONTROL						
			MILL CONTROL						
			MILL CONTROL						
SQ49690	530	HRA139590	MILL CONTROL						
			MILL CONTROL						
			MILL CONTROL						
SQ50217	695	HRA139620	MILL CONTROL						
			MILL CONTROL						
			MILL CONTROL						
SQ50217	733	HRA139580	MILL CONTROL						
			MILL CONTROL						
			MILL CONTROL						
SQ49690	783	HRA139510	MILL CONTROL						
			MILL CONTROL						
			MILL CONTROL						

- * TPA: Transverse pipe axis
- * LPA: Longitudinal pipe axis
- * TWA: Transverse weld axis
- * HAZ: Heat Affect Zone
- * FST: Full Section Testing
- * OD: Outside Diameter
- * ID: Inside Diameter
- * Electric Resistance Welded (Type B)
- * Flattening Test Acceptable
- * 219.1 X 5.61: 13,800KPa
- * Minimum Weld Seam Heat Treatment Temperature: 620(°C)
- * UT Cal To 1/16" Drilled Hole or NS Notch / 6.4mm(Ø) x 1/24(Depth) = FBR / 8mm(w) x 1/24(Depth) = FBR
- * Sew service means that pipes meet CSA clause 16 except for HIC test
- * 17/75 Charpy Test specimen are flattened.
- * CE = C+Pb/(S+Si/24+Cu/15+Ni/20+(Cr+Mo+V+Nb)/5+SB)
- * Latest edition per CSA Z245.1 (2014)

We certify that the product described above has been manufactured, sampled, inspected, and tested in accordance to the referenced specification. This product has been found to be in compliance with all requirements.

Diameter : 219.1 mm			Gage : 5.6 mm		Grade : Gr.359 CAT II M45C SS	
Specification : CSA Z245.1 GR.359 CAT II						
Heat No	Pipe No	Product ID	Test Type	Orientation		
SQ58211	1	HRA139510	Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
			Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
SQ58209	350	HRA139650	Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
			Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
SQ58217	530	HRA139590	Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
			Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
SQ58217	695	HRA139620	Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
			Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
SQ58217	733	HRA139580	Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
			Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
SQ58217	783	HRA051510	Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		
			Transverse weld axis	PIPE TWA		
			Transverse pipe axis	PIPE TPA		

- * TPA: Transverse pipe axis
- * LPA: Longitudinal pipe axis
- * TWA: Transverse weld axis
- * HAZ: Heat Affected Zone
- * PST: Full Section Testing
- * OD: Outside Diameter
- * ID: Inside Diameter

- * Electric Resistance Welded (Type B)
- * Flaming Test Acceptable
- * 219.1 X 5.6: 13.000MPa
- * Minimum Weld Seam Heat Treatment Temperature: 620(°C)
- * UT Cal To 1/16" Drilled Hole or N5 Notch / 6.4mm(Ø) x 1/2(Length) = FBH / 8mm(w) x 15mm(L) x 1/2(Depth) = FBH
- * Sour service means that pipes must CSA clause 16 except for HIC test

We certify that the product described above has been manufactured, sampled, inspected, and tested in accordance to the referenced specification. The product has been found to be in compliance with all requirements.

- * 17.2.b Charpy Test specimen are flattened.
- * CE = $C + F(Mn/6 + Si/24 + Cu/15 + Ni/20 + (Cr + Mo + V + Nb)/5 + Sb)$
- * Latest edition per CSA Z245.1 (2014)

Diameter: 219.1 mm
Specification: CSA Z245.1 GR 359 CAT II

Grade: 01-359 CAT II H45C S5

Grade: 5.5 mm

Specification : CSA Z245.1 OR 359 CAT II																					
Heat No	Pipe No	Product ID	Scale	Location	PM	HAZ		W/MZ		HAZ	PM	AVERAGES			Total Avg						
												PM	HAZ	W/MZ							
SQ58211	1	HRA139510	Rockwell C	OD	10.9	11.4	11.2	11.9	12.0	12.9	12.8	11.8	11.5	11.2	10.7	10.5	10.5	10.9	11.7	12.9	
			Rockwell C	ID	10.7	11.0	10.5	11.5	11.8	11.1	12.2	12.5	13.0	11.7	11.5	11.6	10.2	10.8	10.6	11.5	12.6
SQ58209	350	HRA139650	Rockwell C	OD	11.0	10.8	10.9	12.1	12.5	11.8	12.9	12.7	11.5	11.9	11.7	10.7	10.5	10.9	10.8	11.9	12.8
			Rockwell C	ID	10.9	10.8	10.5	11.3	11.8	11.5	12.2	12.5	12.7	11.6	11.5	11.4	10.5	10.8	10.5	10.7	11.5
SQ58217	733	HRA139680	Rockwell C	OD	11.0	10.8	11.0	12.2	11.9	12.5	13.2	12.9	11.2	11.8	11.2	10.9	10.5	10.8	10.8	11.6	12.9
			Rockwell C	ID	10.8	10.1	11.1	12.5	12.2	12.0	13.1	13.2	12.9	11.4	10.8	11.5	10.2	10.6	10.5	10.6	11.7

- TPA: Transverse plus axis
- LPA: Longitudinal plus axis
- TVA: Transverse weld axis
- FAZ: Heat Affected Zone
- FST: Full Section Testing
- OD: Outside Diameter
- ID: Inside Diameter
- Electric Resistance Welded (Type B)
- Flattening Test Acceptable
- 219.1 X 5.5: 13.800MPa
- Minimum Weld Seam Heat Treatment Temperature: 620(T)
- UT Cal. To 1/16" Drilled Hole or N5 March / 6.4mm(9) = 1/2(Depth) = FBH / 8mm(w) = 15mm(h) = 1/2(Depth) = FBH
- Sour service means that pipes meet CSA G40.21 except for HIC test
- 17.7b Charpy Test specimen are flattened
- CE = $C + F(Mn/S + S/24 + Cu/15 + Ni/20 + (Cr + Nb + V + Hb)/5 + B)$
- Latest edition per CSA Z245.1 (2014)

We certify that the product described above has been manufactured, sampled, inspected, and tested in accordance to the referenced specification. The product has been found to be in compliance with all requirements.

Diameter: 219.1 mm		Gage: 5.6 mm		Grade: GR-359 CAT II N45C SS	
Specification: CSA Z245.1 GR-359 CAT II					

Heat No	Pipe No	Product ID	Scale	Location	PM	HAZ		WHAZ		PM		AVERAGES			Total Avg							
												HAZ	WHAZ									
SQ58211	1	HRA13951D	Vickers HV 500gf	OD	208	0	0	162	0	0	191	0	0	180	0	0	194	172	191			
			Vickers HV 500gf	ID	200	0	0	172	0	0	188	0	0	177	0	0	199	174	188			
			Vickers HV 500gf	HAZ	203	0	0	156	0	0	181	0	0	167	0	0	198	0	0	200	161	181
SQ58209	350	HRA13965D	Vickers HV 500gf	OD	189	0	0	163	0	0	179	0	0	166	0	0	193	164	179			
			Vickers HV 500gf	ID	178	0	0	150	0	0	178	0	0	159	0	0	189	0	0	184	149	178
			Vickers HV 500gf	ID	185	0	0	145	0	0	163	0	0	146	0	0	161	0	0	183	145	162
SQ58217	723	HRA13958D	Vickers HV 500gf	OD	195	0	0	189	0	0	197	0	0	193	0	0	193	191	197			
			Vickers HV 500gf	ID	197	0	0	190	0	0	197	0	0	201	0	0	199	192	197			
			Vickers HV 500gf	ID	191	0	0	191	0	0	197	0	0	193	0	0	187	0	0	190	168	197

- TPA : Transverse pipe axis
- LPA : Longitudinal pipe axis
- TWA : Transverse weld axis
- HAZ : Heat Affected Zone
- JST : Full Section Testing
- OD : Outside Diameter
- ID : Inside Diameter
- Elexsafe Resistance Welded (Type E)
- Flattening Test Acceptable
- 216.1 X 5.6 : 13.800283
- Minimum Weld Bead Heat Treatment Temperature : 620(1)
- UT Cal. To 1/16" Depth Hole or NS Nozzle / 6.4mm(9) a 1/24(Depth) = F8H / 6mm(w) a 1/24(Depth) = FDR
- Sour service means that pipes meet CSA clause 16 except for HIC test
- 11.7b Charpy Test specimen are flattened.
- CE = $C \cdot F(M_A) \cdot e^{-S/24} \cdot C_d / 15 \cdot R / 20 \cdot (C \cdot S \cdot 10 \cdot Y \cdot H \cdot B) / (S \cdot B)$
- Latest edition per CSA Z245.1 (2014)

We certify that the product described above has been manufactured, sampled, inspected, and tested in accordance to the referenced specification. The product has been found to be in compliance with all requirements.