No:20170119-1

Taizhou Elite Drilling Pipe Co.,Ltd

Drill Pipe Quality Certificate

Customer	Channel Ark Enterprises
Ref. No.:	ELT2016-11-22
Quantity	429 Pcs
Total Weight	70.785 T
Total Length	4130.06 M
Standard	API SPEC 5DP-2009 PSL-1

Description																												
	Spec		2 7/8" 10.40		Length range		R2	Steel type of tool joint	SAE4137H1	Size of pin connection	NC31 Φ104.8 OD * Φ50.8 ID		Heat Treatment	Quenching and Tempering														
	Steel Grade		S135		Upset type		EU	Hard band	\	Size of box connection	NC31 Φ104.8 OD * Φ50.8 ID																	
Pipe Body	Drill pipe Manufacturer	M welt No./Heat Treatment No.	(wt%)Chemical Composition											Tensile Test			Impact Test								Appearance Test	NDT
			C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Al	V	YS Rt0.7(M pa) 931~1024	TS Rm(M pa) ≥1000	ELA % ≥11	Akv(J) 1	2	3	Avg ≥38 ≥43	percent shear area 1	2	3	%				
						≤0.020	≤0.015																					
	CB	TX16-03146LG/612271	0.29	0.22	0.9	0.007	0.004	0.91	0.43	0.02	0.04	0.015	0.005	993	1073	21	88	90	96	91	85	85	86		Passed	Passed
			0.29	0.22	0.89	0.007	0.004	0.91	0.44	0.02	0.04	0.015	0.005														
		TX16-03146LG/612272	0.29	0.22	0.9	0.007	0.004	0.91	0.43	0.02	0.04	0.015	0.005	1010	1090	20	92	88	86	85	86	85	85				
			0.29	0.22	0.89	0.007	0.004	0.91	0.44	0.02	0.04	0.015	0.005														
		TX16-03146LG/612273	0.29	0.22	0.9	0.007	0.004	0.91	0.43	0.02	0.04	0.015	0.005	1025	1135	20	86	82	88	85	85	85	86				
			0.29	0.22	0.89	0.007	0.004	0.91	0.44	0.02	0.04	0.015	0.005														

Weld Zone	LOT NO.	NO.	Tensile Test			Impact Test							Hardness Test(HRC) ≤37				Bend Test	Appearance Test	NDT
			YS Rp0.2(M pa) ≥724	TS Rm(M pa) ≥793	EL A% ≥13	Akv(J) 1	2	3	Avg ≥14 ≥16	percent shear area 1	2	3 %	Pipe Body OD	Pipe Body ID	Tool Joint OD	Tool Joint ID			
	612271	6233	865	943	17	82	90	88	87	85	85	85	28.0	27.5	30.5	31.0	Passed	Passed	Passed
	612272	6234	845	925	17	82	84	84	83	85	85	85	28.5	29.0	31.5	31.3			
	612273	6235	845	928	18	82	86	88	85	85	85	85	27.8	27.9	30.3	31.2			

Tool Joint	Tool Joint Manufacturer	M welt No./Heat Treatment No.	(wt%)Chemical Composition								Tensile Test			Impact Test							Hardness Test (HB)285~341			Appearance Test	NDT
			C	Si	Mn	P ≤ 0.020	S ≤ 0.015	Cr	Mo	Ni	YS Rp0.2(M pa) 827~1034	TS Rm(M pa) ≥965	ELA % ≥13	Akv(J) 1	2	3	Avg ≥47 ≥54	percent shear area 1	2	3 %	OD	MD	ID		
	HY	16710036/16CE00133	0.37	0.24	0.91	0.008	0.001	1.10	0.31	0.02	921	1029	19	107	110	112	109	81	81	81	315	321	319	Passed	Passed
		16710036/16CF00414	0.37	0.24	0.91	0.008	0.001	1.10	0.31	0.02	910	1023	19	111	116	113	113	81	81	81	315	313	311		
		16710036/16CF00802	0.37	0.24	0.91	0.008	0.001	1.10	0.31	0.02	903	1018	19	115	119	115	116	81	81	81	315	317	321		

Remarks	1、Specimen size for Impact Test and testing temperature: pipe body 10x7.5x55mm(21℃); weld zone 10x10x55mm(21℃); tool joint 10x10x55mm(-20℃). Specimen size: for Tensile strength: pipe body (specimen strip) 19.1mm; weld zone Φ12.5mm; tool joint Φ12.5mm
	2、NDT: Artificial reference indicators are 1/16 in radially drilled hole N5 notch MT—A30/100
Conclusion	The products listed in this Quality Certificate are all manufactured according to API SPEC 5DP-2009 and API SPEC 7-2 -2008&Addendum2010 .All products have passed the inspection.

TAIZHOU ELITE DRILLING PIPE CO.,LTD 台州精英钻杆有限公司 检验专用章

PREPARED BY: Dengzheng
QUALITY MANAGER

Date:2017.01.19

No:20170119-1

Taizhou Elite Drilling Pipe Co.,Ltd

Drill Pipe Quality Certificate

Customer	Channel Ark Enterprises
Ref. No.:	ELT2016-11-22
Quantity	429 Pcs
Total Weight	70.785 T
Total Length	4130.06 M
Standard	API SPEC 5DP-2009 PSL-1

Description																												
	Spec		2 7/8" 10.40		Length range		R2	Steel type of tool joint	SAE4137H1	Size of pin connection	NC31 Φ104.8 OD * Φ50.8 ID		Heat Treatment	Quenching and Tempering														
	Steel Grade		S135		Upset type		EU	Hard band	\	Size of box connection	NC31 Φ104.8 OD * Φ50.8 ID																	
Pipe Body	Drill pipe Manufacturer	M welt No./Heat Treatment No.	(wt%)Chemical Composition											Tensile Test			Impact Test								Appearance Test	NDT
			C	Si	Mn	P	S	Cr	Mo	Ni	Cu	Al	V	YS Rt0.7(M pa) 931~1024	TS Rm(M pa) ≥1000	ELA % ≥11	Akv(J) 1	2	3	Avg ≥43	percent shear area 1	2	3			
						≤0.020	≤0.015										≥38				%					
	CB	TX16-03146LG/612271	0.29	0.22	0.9	0.007	0.004	0.91	0.43	0.02	0.04	0.015	0.005	993	1073	21	88	90	96	91	85	85	86	Passed	Passed
			0.29	0.22	0.89	0.007	0.004	0.91	0.44	0.02	0.04	0.015	0.005												
		TX16-03146LG/612272	0.29	0.22	0.9	0.007	0.004	0.91	0.43	0.02	0.04	0.015	0.005	1010	1090	20	92	88	86	85	86	85	85			
			0.29	0.22	0.89	0.007	0.004	0.91	0.44	0.02	0.04	0.015	0.005												
		TX16-03146LG/612273	0.29	0.22	0.9	0.007	0.004	0.91	0.43	0.02	0.04	0.015	0.005	1025	1135	20	86	82	88	85	85	85	86			
			0.29	0.22	0.89	0.007	0.004	0.91	0.44	0.02	0.04	0.015	0.005												

Weld Zone	LOT NO.	NO.	Tensile Test			Impact Test							Hardness Test(HRC) ≤37				Bend Test	Appearance Test	NDT
			YS Rp0.2(M pa) ≥724	TS Rm(M pa) ≥793	EL A% ≥13	Akv(J) 1	2	3	Avg ≥16	percent shear area 1	2	3	Pipe Body OD	Pipe Body ID	Tool Joint OD	Tool Joint ID			
						≥14				%									
	612271	6233	865	943	17	82	90	88	87	85	85	85	28.0	27.5	30.5	31.0	Passed	Passed	Passed
	612272	6234	845	925	17	82	84	84	83	85	85	85	28.5	29.0	31.5	31.3			
	612273	6235	845	928	18	82	86	88	85	85	85	85	27.8	27.9	30.3	31.2			

Tool Joint	Tool Joint Manufacturer	M welt No./Heat Treatment No.	(wt%)Chemical Composition								Tensile Test			Impact Test							Hardness Test (HB)285~341			Appearance Test	NDT
			C	Si	Mn	P ≤ 0.020	S ≤ 0.015	Cr	Mo	Ni	YS Rp0.2(M pa) 827~1034	TS Rm(M pa) ≥965	ELA % ≥13	Akv(J) 1	2	3	Avg ≥54	percent shear area 1	2	3	OD	MD	ID		
														≥47				%							
	HY	16710036/16CE00133	0.37	0.24	0.91	0.008	0.001	1.10	0.31	0.02	921	1029	19	107	110	112	109	81	81	81	315	321	319	Passed	Passed
		16710036/16CF00414	0.37	0.24	0.91	0.008	0.001	1.10	0.31	0.02	910	1023	19	111	116	113	113	81	81	81	315	313	311		
		16710036/16CF00802	0.37	0.24	0.91	0.008	0.001	1.10	0.31	0.02	903	1018	19	115	119	115	116	81	81	81	315	317	321		

Remarks	1、Specimen size for Impact Test and testing temperature: pipe body10x7.5x55mm(21℃); weld zone10x10x55mm(21℃); tool joint10x10x55mm(-20℃). Specimen size: for Tensile strength: pipe body (specimen strip) 19.1mm; weld zone Φ12.5mm; tool joint Φ12.5mm
	2、NDT: Artificial reference indicators are: 1/16 in radially drilled hole:N5 notch:MT—A30/100
Conclusion	The products listed in this Quality Certificate are all manufactured according to API SPEC 5DP-2009 and API SPEC 7-2 -2008&Addendum2010 ,All products have passed the inspection.

TAIZHOU ELITE DRILLING PIPE CO.,LTD 检验专用章

PREPARED BY: Dengzheng
QUALITY MANAGER

Date:2017.01.19

Taizhou Elite Drilling Pipe Co.,Ltd

UT INSPECTION REPORT

ELT/A2-14-1 A / 0

Specification	2 7/8"	Material	27CrMo
Heat treatment state	Quenching and Tempering	Grade	S135
Instrument Model	SST-168	Reference Standard	N5
Method	Water film method	Couplant	Water
Inspection Location	Pipe Bod	The reference reflector echo	80%
Probe Type	4Z-2.5P18×10K1 3Z-2.5P12×16K1 4Z-5P18×4×2F10 C543		
Standard	ASTM E213	Acceptance standard	API SPEC 5DP

Serial No.	M welt No./Heat Treatment No.	Check total	Passing No.	Unqualified No.
1	TX16-03146LG/612271	181	181	0
2	TX16-03146LG/612272	180	180	0
3	TX16-03146LG/612273	71	71	0
Remarks				

Inspector	Dou Lanping	Qualification grade	II
Authetication	Zhao Suzhen	Qualification grade	II

TAIZHOU ELITE DRILLING PIPE CO.,LTD 台州优莱特钻杆有限公司 检验专用章

Date:2017.01.19

Taizhou Elite Drilling Pipe Co.,Ltd

UT INSPECTION REPORT

ELT/A2-14-1 A / 0

Specification	2 7/8"	Material	27CrMo
Heat treatment state	Quenching and Tempering	Grade	S135
Instrument Model	SST-168	Reference Standard	N5
Method	Water film method	Couplant	Water
Inspection Location	Pipe Bod	The reference reflector echo	80%
Probe Type	4Z-2.5P18×10K1 3Z-2.5P12×16K1 4Z-5P18×4×2F10 C543		
Standard	ASTM E213	Acceptance standard	API SPEC 5DP

Serial No.	M welt No./Heat Treatment No.	Check total	Passing No.	Unqualified No.
1	TX16-03146LG/612271	181	181	0
2	TX16-03146LG/612272	180	180	0
3	TX16-03146LG/612273	71	71	0
Remarks				

Inspector	Dou Lanping	Qualification grade	II
Authetication	Zhao Suzhen	Qualification grade	II

TAIZHOU ELITE DRILLING PIPE CO.,LTD 台州依特钻杆有限公司 检验专用章

Date:2017.01.19

Taizhou Elite Drilling Pipe Co.,Ltd

Magnetic Particle Examination Peport

ELT/A2-14 A / 0

Specification	2 7/8"	Material	27CrMo
Heat treatment state	Quenching and Tempering	Equipment type	CDG-3000
Particle type	Fluorescent	Sensitivity	A 30/100
Field direction	Longitudinal and transverse	Suspension vehicle	Water
Magnetization method	Wet Continuous Magnetization method	Inspection Location	Weld Zone
Standard	ASTM E709	Acceptance standard	API SPEC 5DP

Result

Serial No.	Heat No.	Check total	Passing No.	Unqualified No.
1	TX16-03146LG/612271	361	361	0
2	TX16-03146LG/612272	360	360	0
3	TX16-03146LG/612273	141	141	0
Remarks				

Inspector	Liuqaping	Qualification grade	II
Authetication	Lue Yi Lu	Qualification grade	II

TAIZHOU ELITE DRILLING PIPE CO.,LTD 泰州优美特钻杆有限公司 检验专用章

Date:2017.01.19

Taizhou Elite Drilling Pipe Co.,Ltd

Magnetic Particle Examination Peport

ELT/A2-14 A / 0

Specification	2 7/8"	Material	27CrMo
Heat treatment state	Quenching and Tempering	Equipment type	CDG-3000
Particle type	Fluorescent	Sensitivity	A 30/100
Field direction	Longitudinal and transverse	Suspension vehicle	Water
Magnetization method	Wet Continuous Magnetization method	Inspection Location	Weld Zone
Standard	ASTM E709	Acceptance standard	API SPEC 5DP

Result

Serial No.	Heat No.	Check total	Passing No.	Unqualified No.
1	TX16-03146LG/612271	361	361	0
2	TX16-03146LG/612272	360	360	0
3	TX16-03146LG/612273	141	141	0
Remarks				

Inspector	Liuqaping	Qualification grade	II
Authetication	Luo Yi Lu	Qualification grade	II

TAIZHOU ELITE DRILLING PIPE CO.,LTD 台州优莱特钻杆有限公司 检验专用章

Date:2017.01.19

GEOMETRIC CHARACTERISTICS OF DRILL PIPES
(New pipe bodies and tool joints) (continued)

Nominal diameter	Nominal weight	Wall thickness	ID		Cross-section	Polar moment of inertia	Polar modulus	Upset and grade		Type of tool joint	Tool joint OD	Tool joint ID	Approximate weight including tool joint	
(in)	(lb/ft)	(mm)	(in)	(mm)	(mm^2)	(mm^4)	(mm^3)				(mm)	(mm)	(kg/m)	(lb/ft)
4 (101.60 mm)	14.00	8.38	3.340	84.84	2 454	5 374 730	105 802	**EU**	**G**	**NC46 (IF)**	**152.4**	**82.6**	**24.10**	**16.19**
								IU	**G**	**NC40(FH)**	**139.7**	**61.9**	**23.59**	**15.85**
								IU	G	H90	139.7	71.4	23.22	15.60
								EU	**S**	**NC46 (IF)**	**152.4**	**76.2**	**24.44**	**16.42**
								IU	**S**	**NC40(FH)**	**139.7**	**50.8**	**24.00**	**16.13**
								IU	S	H90	139.7	71.4	23.22	15.60
4 1/2 (114.30 mm)	13.75	6.88	3.958	100.54	2 322	6 725 300	117 678	**EU**	**E**	**NC50 (IF)**	**161.9**	**95.3**	**22.91**	**15.39**
								EU	E	NC50 (WO)	155.6	98.4	22.03	14.80
								EU	E	OH	146.1	100.8	20.98	14.10
								IU	E	H90	152.4	82.6	22.62	15.20
	16.60	8.56	3.826	97.18	2 844	8 000 523	139 992	**EU**	**E**	**NC50 (IF)**	**161.9**	**95.3**	**26.78**	**18.00**
								EU	E	NC50 (IF)	168.3	95.3	27.49	18.47
								EU	E	OH	149.2	95.3	25.45	17.10
								IEU	**E**	**NC46 (XH)**	**158.8**	**82.6**	**27.34**	**18.37**
								IEU	E	FH	152.4	76.2	27.00	18.14
								IEU	E	H90	152.4	82.6	26.64	17.90
								IEU	E	NC38 (SH)	127.0	68.3	25.00	16.80
								EU	**X**	**NC50 (IF)**	**161.9**	**95.3**	**27.33**	**18.36**
								EU	X	NC50 (IF)	168.3	95.3	28.05	18.85
								IEU	X	NC46 (XH)	158.8	76.2	27.71	18.62
								IEU	X	FH	152.4	76.2	27.02	18.16
								IEU	X	H90	152.4	82.6	26.79	18.00
								EU	**G**	**NC50 (IF)**	**161.9**	**95.3**	**27.33**	**18.36**
								EU	G	NC50 (IF)	168.3	95.3	28.05	18.85
								IEU	G	NC46 (XH)	158.8	76.2	27.71	18.62
								IEU	G	FH	152.4	76.2	27.02	18.16
								IEU	G	H90	152.4	82.6	26.79	18.00
								EU	**S**	**NC50 (IF)**	**161.9**	**88.9**	**27.72**	**18.63**
								EU	S	NC50 (IF)	168.3	88.9	28.44	19.11
								IEU	S	NC46 (XH)	158.8	69.9	28.02	18.83
								IEU	S	FH	158.8	63.5	28.31	19.02
								IEU	S	H90	152.4	76.2	27.02	18.16

mm × 0.0394 = in $mm^2 \times 0.00155 = in^2$ $mm^3 \times 6.10\ 10^{-5} = in^3$ $mm^4 \times 2.40\ 10^{-6} = in^4$