



KING MONGKUT'S UNIVERSITY OF TECHNOLOGY THONBURI
INSTITUTE FOR SCIENTIFIC AND TECHNOLOGICAL RESEARCH AND SERVICES
126 PRACHA-U-THIT RD., BANGMOD, THUNGKRU, BANGKOK 10140 THAILAND
Tel. +66 2470-9671-3, +66 2470-9664-7 Fax +66 2428-3374 <http://www.kmutt.ac.th>

ANNEX 4/4

Our ref : KWTS09-PTT-PQR-R1-2



KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
126 Pracha-Uthit Rd., Bangmod, Thungkru, Bangkok, 10140
THAILAND, Tel 662-470-9674, Fax 662-470-9710

Our ref : KWTS09-PTT-PQR-R1-12

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API2.375-D-12.750-188-T-0.75/Y-42/R1
(API 5L 12" WELDED PIPE, WITH 1" REPAIRING)
DATE OF TESTING : JANUARY 13, 2009

OUR REPORT AS FOLLOWS :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

BY SIGNING THIS CERTIFICATE THE TEST CENTER MAKES NO WARRANTY OF ANY KIND AND NEITHER SHALL THE TEST CENTER BE LIABLE FOR ANY PERSONAL INJURY OR PROPERTY DAMAGE ARISING FROM OR CONNECTED WITH THIS INSPECTION.

INSPECTED BY

CERTIFIED BY

DESTRUCTIVE TESTING SECTOR MANAGER
OF KMUTT'S WELDING
RESEARCH AND CONSULTING CENTER

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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	10:30 AM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWTS09-REQ-PTT-PQR-R1-2	DATE OF REQ.	JANUARY 30, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	LAIZHOU HUAYIN: HV-50A (SN: 0056)				
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE			
PQR No.	PQR/API2.375-D-12.75/T-0.188/Y-42/R1				
SPECIMEN NAME	12-2-HV-01B	TESTING METHOD	VICKER'S (10 kg)		
AMBIENT TEMP.	29.4 °C	HUMIDITY	58.0 %		
TEST LOCATION					
RESULTS OF VICKER'S HARDNESS TESTING					
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE
	No.	HV10	No.	HV10	No.
	1	151	4	178	7
	2	156	5	179	8
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE
	No.	HV10	No.	HV10	No.
	16	156	19	179	22
	17	154	20	182	23
	BASE	HAZ	WELD METAL	HAZ	BASE
	No.	HV10	No.	HV10	No.
	18	-	21	-	24
	19	-	22	-	25

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Our ref : KWT809-PTT-PQR-R1-12



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NICK-BREAK TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	09:45 PM	
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)			
REQUEST No.	KWT809-REQ-PTT-PQR-R1-12	DATE OF REQ.	JANUARY 13, 2009	
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER			
TESTING M/C	100 TONS PRESSING MACHINE			
PQR No.	PQR/API2.375-D-12.75/0.188-T-0.75/Y-42/R1			
SPECIMEN NAME	J2-12-NB-01A	J2-12-NB-02C	-	
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %	
RESULTS OF NICK-BREAK TESTING				
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result
1	J2-12-NB-01A	2 ends Support	NO OPENING INDICATION	PASS
2	J2-12-NB-02C	2 ends Support	NO OPENING INDICATION	PASS

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TENSION TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	09:45 PM					
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)							
REQUEST No.	KWT809-REQ-PTT-PQR-R1-12	DATE OF REQ.	JANUARY 13, 2009					
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER							
TESTING M/C	CHUN YEN, CY-604041							
PQR No.	PQR/API2.375-D-12.75/0.188-T-0.75/Y-42/R1							
SPECIMEN NAME	J2-12-TS-01A	J2-12-TS-02C	-					
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %					
RESULTS OF TENSION TESTING								
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)	Result
1	J2-12-TS-01A	0.39	17,288.09	29,900.62	44,829.51	77,534.90	8.72	PASS
2	J2-12-TS-02C	0.37	17,613.09	29,262.03	47,790.99	79,398.96	6.48	PASS

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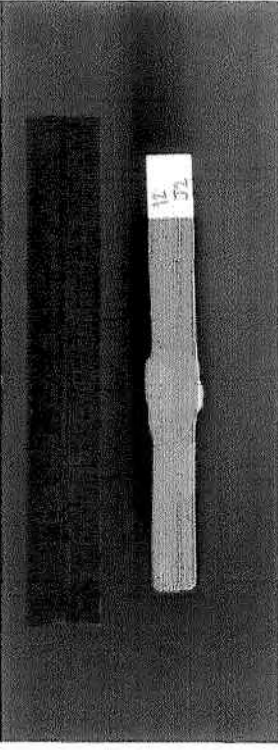
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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	09:45 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R1-12	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/2.375-D-12.75/0.188-T-0.75/Y-42/R1		
SPECIMEN NAME	J2-12-HV-01A	-	-
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	09:45 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R1-12	DATE OF REQ.	JANUARY 13, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/2.375-D-12.75/0.188-T-0.75/Y-42/R1				
SPECIMEN NAME	J2-12-RB-01B	J2-12-RB-02D	J2-12-FB-01B J2-12-FB-02D		
AMBIENT TEMP.	27.0 °C	HUMIDITY	52.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J2-12-RB-01B	3.5	4.625	NO OPENING INDICATION	PASS
2	J2-12-RB-02D	3.5	4.625	NO OPENING INDICATION	PASS
3	J2-12-FB-01B	3.5	4.625	NO OPENING INDICATION	PASS
4	J2-12-FB-02D	3.5	4.625	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R1-16GRB

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API12.75-D/0.188-T-0.75/Y-42/R1
(API 5L Gr B 16" WELDED PIPE, WITH 1" REPAIRING)
DATE OF TESTING : JANUARY 13, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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CERTIFIED BY

DESTRUCTIVE TESTING SECTOR MANAGER
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Our ref : KWT509-PTT-PQR-R1-12

ANNEX 5/5
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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	09:45 PM			
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.	KWT509-REQ-PTT-PQR-R1-12	DATE OF REQ.	JANUARY 13, 2009			
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)					
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE				
PQR No.	PQR/API2.375-D-12.75/0.188-T-0.75/Y-42/R1					
SPECIMEN NAME	J2-12-HV-01B	TESTING METHOD	VICKER'S (10 kg)			
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %			
TEST LOCATION						
RESULTS OF VICKER'S HARDNESS TESTING						
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	1	139	4	164	7	181
	2	147	5	162	8	180
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	16	149	19	-	22	185
	17	142	20	-	23	183
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	18	149	21	-	24	186
	19	149	21	-	24	186

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NICK-BREAK TESTING REPORT

DATE OF TESTING		JANUARY 13, 2009		TIME OF TESTING		03:00 PM	
CLIENT		ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.		KWT509-REQ-PTT-PQR-R1-16GRB		DATE OF REQ.		JANUARY 13, 2009	
PLACE OF TEST		KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C		100 TONS PRESSING MACHINE					
PQR No.		PQR/API/12.75-D/0.188-T-0.75/Y-42/R1					
SPECIMEN NAME		J2-16GRB-NB-01A	J2-16GRB-NB-02B	J2-16GRB-NB-03C	J2-16GRB-NB-04D		
AMBIENT TEMP.		25.0 °C		HUMIDITY		45.0 %	
RESULTS OF NICK-BREAK TESTING							
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result			
1	J2-16GRB-NB-01A	2 ends Support	NO OPENING INDICATION	PASS			
2	J2-16GRB-NB-02B	2 ends Support	NO OPENING INDICATION	PASS			
3	J2-16GRB-NB-03C	2 ends Support	NO OPENING INDICATION	PASS			
4	J2-16GRB-NB-04D	2 ends Support	NO OPENING INDICATION	PASS			

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TENSION TESTING REPORT

DATE OF TESTING		JANUARY 13, 2009		TIME OF TESTING		03:00 PM	
CLIENT		ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.		KWT509-REQ-PTT-PQR-R1-16GRB		DATE OF REQ.		JANUARY 13, 2009	
PLACE OF TEST		KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C		CHUN YEN, CY-604041					
PQR No.		PQR/API/12.75-D/0.188-T-0.75/Y-42/R1					
SPECIMEN NAME		J2-16GRB-TS-01A	J2-16GRB-TS-02B	J2-16GRB-TS-03C	J2-16GRB-TS-04D		
AMBIENT TEMP.		25.0 °C		HUMIDITY		45.0 %	
RESULTS OF TENSION TESTING							
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)
1	J2-16GRB-TS-01A	0.39	24,660.59	29,193.59	63,890.57	75,634.64	23.86
2	J2-16GRB-TS-02B	0.35	22,436.87	26,285.63	63,633.59	74,549.15	10.74
3	J2-16GRB-TS-03C	0.37	24,478.13	28,013.30	66,998.91	76,675.00	13.2
4	J2-16GRB-TS-04D	0.39	25,607.12	29,438.77	65,211.53	74,969.30	9.2

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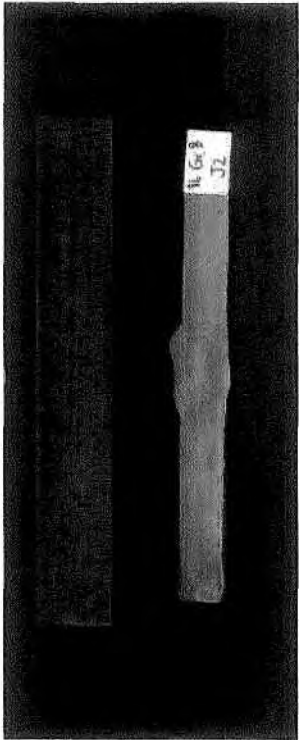
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THAILAND, Tel 662-470-9674, Fax 662-470-9710

MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	03:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R1-16GRB	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/12.75-D/0.188-T-0.75/Y-42/R1		
SPECIMEN NAME	J2-16GRB-HV-01A		
AMBIENT TEMP.	25.0 °C	HUMIDITY	45.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	03:00 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R1-16GRB	DATE OF REQ.	JANUARY 13, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/12.75-D/0.188-T-0.75/Y-42/R1				
SPECIMEN NAME	J2-16GRB-FB-01A	J2-16GRB-FB-02B	J2-16GRB-RB-02B		
	J2-16GRB-FB-03C	J2-16GRB-RB-03C	J2-16GRB-RB-04D		
AMBIENT TEMP.	25.0 °C	HUMIDITY	45.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J2-16GRB-FB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J2-16GRB-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
3	J2-16GRB-FB-02B	3.5	4.625	NO OPENING INDICATION	PASS
4	J2-16GRB-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS
5	J2-16GRB-FB-03C	3.5	4.625	NO OPENING INDICATION	PASS
6	J2-16GRB-RB-03C	3.5	4.625	NO OPENING INDICATION	PASS
7	J2-16GRB-FB-04D	3.5	4.625	NO OPENING INDICATION	PASS
8	J2-16GRB-RB-04D	3.5	4.625	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R1-34

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R1
(API 5L 34" WELDED PIPE, WITH 1" REPAIRING)
DATE OF TESTING : FEBRUARY 2, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	03:00 PM			
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.	KWT509-REQ-PTT-PQR-R1-16GRB	DATE OF REQ.	JANUARY 13, 2009			
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (SN: 0056)					
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE				
PQR No.	PQR/API/12.75-D/0.188-T-0.75/Y-42/R1					
SPECIMEN NAME	32-16GRB-HV-01B	TESTING METHOD	VICKER'S (10 kg)			
AMBIENT TEMP.	25.0 °C	HUMIDITY	45.0 %			
TEST LOCATION						
RESULTS OF VICKER'S HARDNESS TESTING						
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	1	186	4	190	7	214
	2	185	5	191	8	218
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	16	185	19	-	22	216
	17	183	20	-	23	216
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	18	183	21	-	24	220
	19	183	22	-	25	216

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Our ref : KWT509-PTT-PQR-R1-34



KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
126 Pracha-Uth Rd., Bangmod, Tung-kru, Bangkok, 10140
THAILAND, Tel 662-470-9674, Fax 662-470-9710

NICK-BREAK TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	01:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R1-34	DATE OF REQ.	FEBRUARY 2, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING M/C	100 TONS PRESSING MACHINE		
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R1		
SPECIMEN NAME	J2-34-NB-01A	J2-34-NB-02B	J2-34-NB-03C
AMBIENT TEMP.	26.3 °C	HUMIDITY	49 %

RESULTS OF NICK-BREAK TESTING				
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result
1	J2-34-NB-01A	2 ends Support	NO OPENING INDICATION	PASS
2	J2-34-NB-02B	2 ends Support	NO OPENING INDICATION	PASS
3	J2-34-NB-03C	2 ends Support	NO OPENING INDICATION	PASS
4	J2-34-NB-04D	2 ends Support	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R1-34



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TENSION TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	01:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R1-34	DATE OF REQ.	FEBRUARY 2, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING M/C	CHUN YEN, CY-604041		
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R1		
SPECIMEN NAME	J2-34-TS-01A	J2-34-TS-02B	J2-34-TS-03C
AMBIENT TEMP.	26.3 °C	HUMIDITY	49 %

RESULTS OF TENSION TESTING								
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)	Result
1	J2-34-TS-01A	0.61	35,055.12	45,831.68	57,832.97	75,611.84	24.63	PASS
2	J2-34-TS-02B	0.62	32,956.84	46,458.87	53,529.46	75,459.85	24.5	PASS
3	J2-34-TS-03C	0.59	34,787.14	46,219.39	58,586.38	77,839.89	26.87	PASS
4	J2-34-TS-04D	0.62	40,882.43	47,080.37	65,746.96	75,714.47	21.13	PASS

TESTED BY

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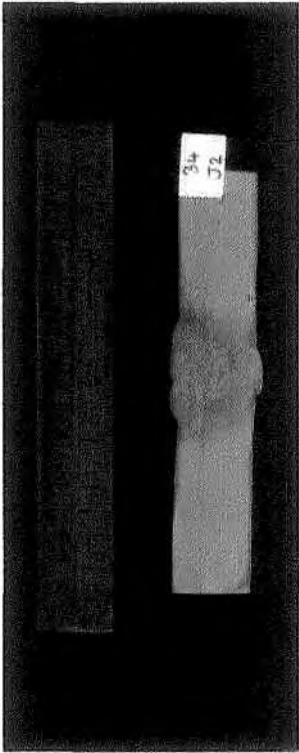
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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	01:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R1-34	DATE OF REQ.	FEBRUARY 2, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R1		
SPECIMEN NAME	J2-34-HV-01A		
AMBIENT TEMP.	26.3 °C	HUMIDITY	49 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

TESTED BY

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Our ref : KWT509-PTT-PQR-R1-34



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THAILAND, Tel 662-470-9674, Fax 662-470-9710

GUIDED-BEND TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	01:00 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R1-34	DATE OF REQ.	FEBRUARY 2, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R1				
SPECIMEN NAME	J2-34-FB-01A	J2-34-FB-02B	J2-34-RB-02B		
	J2-34-FB-03C	J2-34-FB-04D	J2-34-RB-04D		
AMBIENT TEMP.	26.3 °C	HUMIDITY	49 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J2-34-FB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J2-34-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
3	J2-34-FB-02B	3.5	4.625	NO OPENING INDICATION	PASS
4	J2-34-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS
5	J2-34-FB-03C	3.5	4.625	NO OPENING INDICATION	PASS
6	J2-34-RB-03C	3.5	4.625	NO OPENING INDICATION	PASS
7	J2-34-FB-04D	3.5	4.625	NO OPENING INDICATION	PASS
8	J2-34-RB-04D	3.5	4.625	NO OPENING INDICATION	PASS

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Tel. +66 2470-9671-3, +66 2470-9664-7 Fax +66 2428-3374 <http://www.kmutt.ac.th>

Our ref : **KWTS09-PTT-PQR-R1-34**

ANNEX 5/5

KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
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THAILAND, Tel 662-470-9674, Fax 662-470-9710

Our ref : **KWTS09-PTT-PQR-R1-16X65**

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)

PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER

SUBJECT : PQR TEST

CODE OR STANDARD : API 1104 (2005)

SPECIMEN NAME : PQR/API12.75-D/0.188-T-0.75/65-Y/R1
(API 5L X65 Ø 16" WELDED PIPE, WITH 1" REPAIRING)

DATE OF TESTING : JANUARY 13, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

BY SIGNING THIS CERTIFICATE THE TEST CENTER MAKES NO WARRANTY OF ANY KIND AND NEITHER SHALL THE TEST CENTER BE LIABLE FOR ANY PERSONAL INJURY OR PROPERTY DAMAGE ARISING FROM OR CONNECTED WITH THIS INSPECTION.

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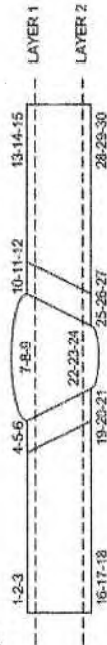
DESTRUCTIVE TESTING SECTOR MANAGER
OF KMUTT'S WELDING
RESEARCH AND CONSULTING CENTER

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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	01:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWTS09-REQ-PTT-PQR-R1-34	DATE OF REQ.	FEBRUARY 2, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)		
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE	
PQR No.	PQR/API12.75-D/0.188-T-0.75/42-Y-65/R1		
SPECIMEN NAME	J2-34-HV-01B	TESTING METHOD	VICKER'S (10 kg)
AMBIENT TEMP.	26.3 °C	HUMIDITY	49 %

TEST LOCATION



RESULTS OF VICKER'S HARDNESS TESTING

	BASE		HAZ		WELD METAL		HAZ		BASE	
	No.	HV10	No.	HV10	No.	HV10	No.	HV10	No.	HV10
LAYER 1	1	150	4	160	7	171	10	166	13	152
	2	153	5	171	8	179	11	168	14	154
	3	156	6	167	9	173	12	167	15	154
LAYER 2	BASE		HAZ		WELD METAL		HAZ		BASE	
	16	159	19	165	22	176	25	165	28	154
	17	155	20	162	23	177	26	162	29	157
	18	156	21	164	24	176	27	165	30	156

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Our ref : KWT809-PTT-PQR-R1-16X65



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NICK-BREAK TESTING REPORT

DATE OF TESTING		JANUARY 13, 2009		TIME OF TESTING		03:00 PM	
CLIENT		ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.		KWT809-REQ-PTT-PQR-R1-16X65		DATE OF REQ.		JANUARY 13, 2009	
PLACE OF TEST		KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C		100 TONS PRESSING MACHINE					
PQR No.		PQR/API/12.75-D/0.188-T-0.75/65-Y/R1					
SPECIMEN NAME		J2-16X65-NB-01A		J2-16X65-NB-02B		J2-16X65-NB-03C	
AMBIENT TEMP.		24.9 °C		HUMIDITY		46.0 %	
RESULTS OF NICK-BREAK TESTING							
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result			
1	J2-16 X65-NB-01A	2 ends Support	NO OPENING INDICATION	PASS			
2	J2-16 X65-NB-02B	2 ends Support	NO OPENING INDICATION	PASS			
3	J2-16 X65-NB-03C	2 ends Support	NO OPENING INDICATION	PASS			
4	J2-16 X65-NB-04D	2 ends Support	NO OPENING INDICATION	PASS			

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Our ref : KWT809-PTT-PQR-R1-16X65



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THAILAND, Tel 662-470-9674, Fax 662-470-9710

TENSION TESTING REPORT

DATE OF TESTING		JANUARY 13, 2009		TIME OF TESTING		03:00 PM	
CLIENT		ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.		KWT809-REQ-PTT-PQR-R1-16X65		DATE OF REQ.		JANUARY 13, 2009	
PLACE OF TEST		KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C		CHUN YEN, CY-604041					
PQR No.		PQR/API/12.75-D/0.188-T-0.75/65-Y/R1					
SPECIMEN NAME		J2-16X65-TS-01A		J2-16 X65-TS-02B		J2-16 X65-TS-03C	
AMBIENT TEMP.		24.9 °C		HUMIDITY		46.0 %	
RESULTS OF TENSION TESTING							
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. Result
1	J2-16X65-TS-01A	0.38	29,917.73	33,971.77	79,690.03	90,488.54	13.94 PASS
2	J2-16 X65-TS-02B	0.35	29,307.64	33,401.57	84,092.14	95,838.82	14.99 PASS
3	J2-16 X65-TS-03C	0.37	29,837.91	34,701.59	81,197.19	94,432.60	15.57 PASS
4	J2-16 X65-TS-04D	0.35	29,723.87	34,268.26	83,986.56	96,827.02	14.29 PASS

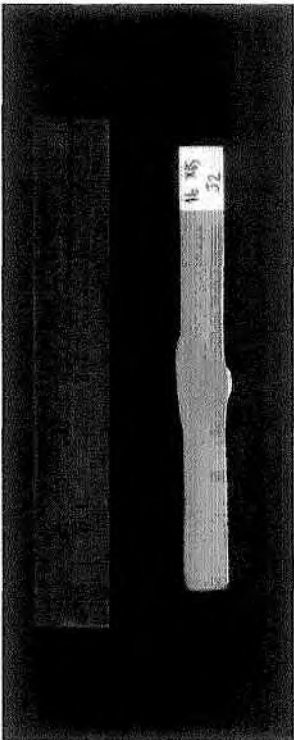
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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	03:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT/S09-REQ-PTT-PQR-R1-16X65	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE #240 - #500 SANDPAPER MANUALLY GRINDED		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/12.75-D/0.188-T-0.75/65-Y/R1		
SPECIMEN NAME	J2-16X65-HV-01A	-	-
AMBIENT TEMP.	24.9 °C	HUMIDITY	46.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

TESTED BY

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GUIDED-BEND TESTING REPORT

DATE OF TESTING		JANUARY 13, 2009		TIME OF TESTING		03:00 PM	
CLIENT		ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.		KWTS09-REQ-PTT-PQR-R1-16X65		DATE OF REQ.		JANUARY 13, 2009	
PLACE OF TEST		KMUUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C		100 TONS PRESSING MACHINE					
PQR No.		PQR/API/12.75-D/0.188-T-0.75/65-Y/R1					
SPECIMEN NAME		J2-16X65-FB-01A	J2-16 X65-RB-01A		J2-16 X65-FB-02B		J2-16 X65-RB-02B
		J2-16 X65-FB-03C	J2-16 X65-RB-03C		J2-16 X65-FB-04D		J2-16 X65-RB-04D
AMBIENT TEMP.		24.9 °C		HUMIDITY		46.0 %	
RESULTS OF GUIDED-BEND TESTING							
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)		Remark	
1	J2-16X65-FB-01A	3.5	4.625	NO OPENING INDICATION		PASS	
2	J2-16 X65-RB-01A	3.5	4.625	NO OPENING INDICATION		PASS	
3	J2-16 X65-FB-02B	3.5	4.625	NO OPENING INDICATION		PASS	
4	J2-16 X65-RB-02B	3.5	4.625	NO OPENING INDICATION		PASS	
5	J2-16 X65-FB-03C	3.5	4.625	NO OPENING INDICATION		PASS	
6	J2-16 X65-RB-03C	3.5	4.625	NO OPENING INDICATION		PASS	
7	J2-16 X65-FB-04D	3.5	4.625	NO OPENING INDICATION		PASS	
8	J2-16 X65-RB-04D	3.5	4.625	0.5 mm		PASS	

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Tel. +66 2470-9671-3, +66 2470-9664-7 Fax +66 2428-3374 <http://www.kmutt.ac.th>

Our ref : KWT509-PTT-PQR-R1-42

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API/12.75-D/0.75-T/65-Y/R1
(API 5L 42" WELDED PIPE, WITH 1" REPAIRING)
DATE OF TESTING : JANUARY 13, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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CERTIFIED BY

DESTRUCTIVE TESTING SECTOR MANAGER
OF KMUTT'S WELDING
RESEARCH AND CONSULTING CENTER

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ANNEX 5/5



Our ref : KWT509-PTT-PQR-R1-16X65

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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	03:00 PM			
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.	KWT509-REQ-PTT-PQR-R1-16X65	DATE OF REQ.	JANUARY 13, 2009			
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)					
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE				
PQR No.	PQR/API/12.75-D/0.188-T/0.75/65-Y/R1					
SPECIMEN NAME	12-16X65-HV-01B	TESTING METHOD	VICKER'S (10 kg)			
AMBIENT TEMP.	24.9 °C	HUMIDITY	46.0 %			
TEST LOCATION						
RESULTS OF VICKER'S HARDNESS TESTING						
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	1	207	4	208	7	230
	2	206	5	211	8	233
3	207	6	201	9	230	
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	16	208	19	-	22	231
	17	206	20	-	23	232
18	208	21	-	24	230	

TESTED BY

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Our ref : KWT509-PTT-PQR-R1-42



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NICK-BREAK TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:30 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R1-42	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING M/C	100 TONS PRESSING MACHINE		
PQR No.	PQR/API/12.75-D/0.75-T/65-Y/R1		
SPECIMEN NAME	J2-42-NB-01A	J2-42-NB-02B	J2-42-NB-03C
AMBIENT TEMP.	25.1 °C	HUMIDITY	53.0 %
RESULTS OF NICK-BREAK TESTING			
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)
1	J2-42-NB-01A	2 ends Support	NO OPENING INDICATION
2	J2-42-NB-02B	2 ends Support	NO OPENING INDICATION
3	J2-42-NB-03C	2 ends Support	NO OPENING INDICATION
4	J2-42-NB-04D	2 ends Support	NO OPENING INDICATION

TESTED BY

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Our ref : KWT509-PTT-PQR-R1-42



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126 Prachin-Uthi Rd., Bangmod, Tung-kru, Bangkok, 10140
THAILAND, Tel 662-470-9674, Fax 662-470-9710

TENSION TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009		TIME OF TESTING		01:30 PM			
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)							
REQUEST No.	KWT509-REQ-PTT-PQR-R1-42		DATE OF REQ.		JANUARY 13, 2009			
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER							
TESTING M/C	CHUN YEN, CY-604041							
PQR No.	PQR/API/12.75-D/0.75-T/65-Y/R1							
SPECIMEN NAME	J2-42-TS-01A	J2-42-TS-02B	J2-42-TS-03C	J2-42-TS-04D				
AMBIENT TEMP.	25.1 °C		HUMIDITY		53.0 %			
RESULTS OF TENSION TESTING								
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)	Result
	Requirement	-	-	-	-	77,000	-	
1	J2-42-TS-01A	0.80	53,916.93	65,571.55	67,198.01	81,723.45	30.31	PASS
2	J2-42-TS-02B	0.80	54,430.10	65,508.83	68,355.21	82,268.27	30.34	PASS
3	J2-42-TS-02C	0.82	52,770.84	68,462.40	64,284.35	83,399.49	31.02	PASS
4	J2-42-TS-02D	0.85	59,071.41	69,768.13	69,601.89	82,205.48	33.04	PASS

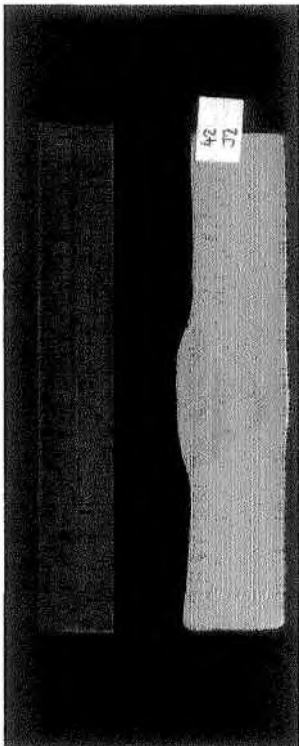
TESTED BY

REVIEWED

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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:30 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWTS09-REQ-PTT-PQR-R1-42	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
	#240 - #500 SANDPAPER MANUALLY GRINDED		
ETCHANT	NITAL/ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/12.75-D/0.75-T/65-Y/R1		
SPECIMEN NAME	J2-42-HV-01A	-	-
AMBIENT TEMP.	25.1 °C	HUMIDITY	53.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

TESTED BY

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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:30 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWTS09-REQ-PTT-PQR-R1-42	DATE OF REQ.	JANUARY 13, 2009		
PLACE OF TEST	KMUUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API12.75-D/0.75-T/65-Y/R1				
SPECIMEN NAME	J2-42-FB-01A	J2-42-RB-01A	J2-42-FB-02B		
	J2-42-FB-03C	J2-42-RB-03C	J2-42-FB-04D		
AMBIENT TEMP.	25.1 °C	HUMIDITY	53.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J2-42-FB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J2-42-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
3	J2-42-FB-02B	3.5	4.625	NO OPENING INDICATION	PASS
4	J2-42-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS
5	J2-42-FB-03C	3.5	4.625	NO OPENING INDICATION	PASS
6	J2-42-RB-03C	3.5	4.625	NO OPENING INDICATION	PASS
7	J2-42-FB-04D	3.5	4.625	NO OPENING INDICATION	PASS
8	J2-42-RB-04D	3.5	4.625	1 mm. at Corner	PASS

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INSTITUTE FOR SCIENTIFIC AND TECHNOLOGICAL RESEARCH AND SERVICES
126 PRACHA-U-THIT RD., BANGMOD, THUNGKRU, BANGKOK 10140 THAILAND
Tel. +66 2470-9671-3, +66 2470-9664-7 Fax +66 2428-3374 <http://www.kmutt.ac.th>

Our ref : KWT509-PTT-PQR-R1-42

ANNEX 5/5
K MUTT'S WELDING RESEARCH AND CONSULTING CENTER
126 Pracha-Uthi Rd., Bangmod, Thungkru, Bangkok, 10140
THAILAND, Tel 662-470-9674, Fax 662-470-9710



VICKER'S HARDNESS TESTING REPORT

Our ref : KWT509-PTT-PQR-R2-1.5

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : K MUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API/D-2.375/T-0.188/Y-42/R2
(API 5L Ø1.5" WELDED PIPE, WITH 2nd REPAIRING)
DATE OF TESTING : JANUARY 30, 2009

OUR REPORT AS FOLLOW :

1. NICK-BREAK TESTING REPORT
2. GUIDED-BEND TESTING REPORT
3. MACRO STRUCTURE TESTING REPORT
4. VICKER'S HARDNESS TESTING REPORT

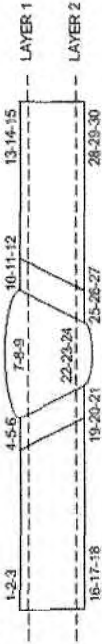
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INSPECTED BY [REDACTED]

CERTIFIED BY [REDACTED]

DESTRUCTIVE TESTING SECTOR MANAGER
OF K MUTT'S WELDING
RESEARCH AND CONSULTING CENTER

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DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:30 PM							
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)									
REQUEST No.	KWT509-REQ-PTT-PQR-R1-42	DATE OF REQ.	JANUARY 13, 2009							
PLACE OF TEST	K MUTT'S WELDING RESEARCH AND CONSULTING CENTER									
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)									
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE								
PQR No.	PQR/API/12.75-D/0.75-T/65-Y/R1									
SPECIMEN NAME	J2-42-HV-01B	TESTING METHOD	VICKER'S (10 kg)							
AMBIENT TEMP.	25.1 °C	HUMIDITY	53.0 %							
TEST LOCATION										
										
RESULTS OF VICKER'S HARDNESS TESTING										
LAYER 1	BASE		HAZ		WELD METAL		HAZ		BASE	
	No.	HV10	No.	HV10	No.	HV10	No.	HV10	No.	HV10
	1	190	4	203	7	220	10	210	13	195
	2	196	5	202	8	220	11	207	14	192
	3	196	6	204	9	216	12	203	15	197
LAYER 2	BASE		HAZ		WELD METAL		HAZ		BASE	
	No.	HV10	No.	HV10	No.	HV10	No.	HV10	No.	HV10
	16	197	19	205	22	214	25	205	28	193
	17	199	20	203	23	219	26	203	29	197
	18	199	21	206	24	214	27	209	30	194

TESTED BY [REDACTED]

REVIEWED BY [REDACTED]

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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	04:30 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWTS09-REQ-PTT-PQR-R2-1.5	DATE OF REQ.	JANUARY 30, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/D-2.375/T-0.188/Y-42/R2				
SPECIMEN NAME	J3-1.5-RB-01A	J3-1.5-RB-02B	-		
AMBIENT TEMP.	28.0 °C	HUMIDITY	55.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J3-1.5-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J3-1.5-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS

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NICK-BREAK TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	04:30 PM	
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)			
REQUEST No.	KWTS09-REQ-PTT-PQR-R2-1.5	DATE OF REQ.	JANUARY 30, 2009	
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER			
TESTING M/C	100 TONS PRESSING MACHINE			
PQR No.	PQR/API/D-2.375/T-0.188/Y-42/R2			
SPECIMEN NAME	J3-1.5-NB-01A	J3-1.5-NB-02B	-	
AMBIENT TEMP.	28.0 °C	HUMIDITY	55.0 %	
RESULTS OF NICK-BREAK TESTING				
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result
1	J3-1.5-NB-01A	2 ends Support	NO OPENING INDICATION	PASS
2	J3-1.5-NB-02B	2 ends Support	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R2-1.5



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THAILAND, Tel 662-470-9674, Fax 662-470-9710

VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	04:30 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R2-1.5	DATE OF REQ.	JANUARY 30, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)				
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE			
PQR No.	PQR/API/D-2.375/T-0.188/Y-42/R2				
SPECIMEN NAME	J3-1.5-HV-01B	TESTING METHOD	VICKER'S (10 kg)		
AMBIENT TEMP.	28.0 °C	HUMIDITY	55.0 %		
RESULTS OF VICKER'S HARDNESS TESTING					
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE
	No.	HV10	No.	HV10	No.
	1	148	4	163	10
	2	148	5	164	11
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE
	No.	HV10	No.	HV10	No.
	16	147	19	161	22
	17	144	20	159	23
18	-	21	-	24	-
19	-	22	-	25	-
20	-	23	-	26	-
21	-	24	-	27	-
22	-	25	-	28	-
23	-	26	-	29	-
24	-	27	-	30	-

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Our ref : KWT509-PTT-PQR-R2-1.5



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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	04:30 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R2-1.5	DATE OF REQ.	JANUARY 30, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/D-2.375/T-0.188/Y-42/R2		
SPECIMEN NAME	J3-1.5-HV-01A	-	-
AMBIENT TEMP.	28.0 °C	HUMIDITY	55.0 %
RESULTS OF MACROSTRUCTURE TESTING			
COMMENTS	COMPLETE		

TESTED BY

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Our ref : KWT509-PTT-PQR-R2-2

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API/2.375-D-12.75/T-0.188/Y-42/R2
(API 5L Ø 2" WELDED PIPE, WITH 2nd REPAIRING)
DATE OF TESTING : JANUARY 30, 2009

OUR REPORT AS FOLLOW :

1. NICK-BREAK TESTING REPORT
2. GUIDED-BEND TESTING REPORT
3. MACRO STRUCTURE TESTING REPORT
4. VICKER'S HARDNESS TESTING REPORT

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INSPECTED BY

CERTIFIED BY

DESTRUCTIVE TESTING SECTOR MANAGER
OF KMUTT'S WELDING
RESEARCH AND CONSULTING CENTER

ANNEX 1/4

Our ref : KWT509-PTT-PQR-R2-2

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126 Pracha-Uthit Rd., Bangmod, Thungkru, Bangkok, 10140
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NICK-BREAK TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	5:30 AM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R2-2	DATE OF REQ.	JANUARY 30, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING M/C	100 TONS PRESSING MACHINE		
PQR No.	PQR/API/2.375-D-12.75/T-0.188/Y-42/R2		
SPECIMEN NAME	J3-2-NB-01A	J3-2-NB-02B	-
AMBIENT TEMP.	28.0 °C	HUMIDITY	56.0 %
RESULTS OF NICK-BREAK TESTING			
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)
1	J3-2-NB-01A	2 ends Support	NO OPENING INDICATION
2	J3-2-NB-02B	2 ends Support	NO OPENING INDICATION

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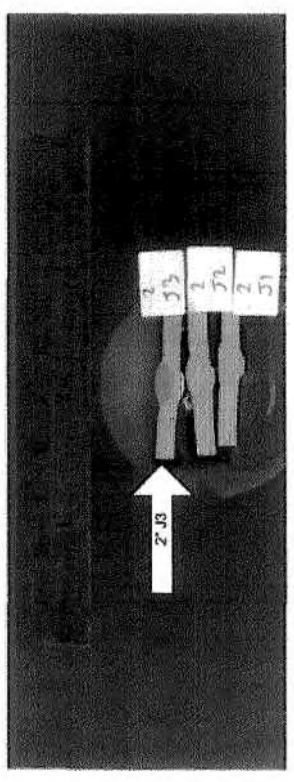
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Our ref : KWT509-PTT-PQR-R2-2



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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	5:30 AM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R2-2	DATE OF REQ.	JANUARY 30, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API2.375-D-12.75/T-0.188/Y-42/R2		
SPECIMEN NAME	J3-2-HV-01A		
AMBIENT TEMP.	28.0°C	HUMIDITY	56.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

TESTED BY

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Our ref : KWT509-PTT-PQR-R2-2



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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	5:30 AM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R2-2	DATE OF REQ.	JANUARY 30, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API2.375-D-12.75/T-0.188/Y-42/R2				
SPECIMEN NAME	J3-2-RB-01A				
AMBIENT TEMP.	28.0°C	HUMIDITY	56.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J3-2-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J3-2-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS

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ANNEX 4/4

Our ref : KWT509-PTT-PQR-R2-2



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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 30, 2009	TIME OF TESTING	5:30 AM							
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)									
REQUEST No.	KWT509-REQ-PTT-PQR-R2-2	DATE OF REQ.	JANUARY 30, 2009							
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER									
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)									
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE								
PQR No.	PQR/API2.375-D-12.75-T-0.188/Y-42/R2									
SPECIMEN NAME	J3-2-HV-01B	TESTING METHOD	VICKER'S (10 kg)							
AMBIENT TEMP.	28.0 °C	HUMIDITY	56.0 %							
TEST LOCATION										
RESULTS OF VICKER'S HARDNESS TESTING										
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE					
	No.	HV10	No.	HV10	No.	HV10				
	1	136	4	165	7	196	10	170	13	140
	2	137	5	167	8	192	11	169	14	139
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE					
	No.	HV10	No.	HV10	No.	HV10				
	16	139	19	169	22	196	25	173	28	137
	17	142	20	172	23	199	26	167	29	143
LAYER 3	BASE	HAZ	WELD METAL	HAZ	BASE					
	No.	HV10	No.	HV10	No.	HV10				
	18	-	21	-	24	-	27	-	30	-

Our ref : KWT509-PTT-PQR-R2-12

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API2.375-D-12.75-T-0.188-Y-42/R2
(API 5L 12" WELDED PIPE, WITH 2nd REPAIRING)
DATE OF TESTING : JANUARY 13, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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INSPECTED BY

CERTIFIED BY

DESTRUCTIVE TESTING SECTOR MANAGER
OF KMUTT'S WELDING
RESEARCH AND CONSULTING CENTER

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Our ref : KWT509-PTT-PQR-R2-12



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THAILAND, Tel 662-470-9674, Fax 662-470-9710

NICK-BREAK TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	04:00 PM	
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)			
REQUEST No.	KWT509-REQ-PTT-PQR-R2-12	DATE OF REQ.	JANUARY 13, 2009	
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER			
TESTING M/C	100 TONS PRESSING MACHINE			
PQR No.	PQR/API/2.375-D-12.75/0.188-T-0.75/Y-42/R2			
SPECIMEN NAME	J3-12-NB-01A	J3-12-NB-02C	-	
AMBIENT TEMP.	28.4 °C	HUMIDITY	44.0 %	
RESULTS OF NICK-BREAK TESTING				
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result
1	J3-12-NB-01A	2 ends Support	NO OPENING INDICATION	PASS
2	J3-12-NB-02C	2 ends Support	0.5 mm, Gas Pocket	PASS

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Our ref : KWT509-PTT-PQR-R2-12



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TENSION TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	04:00 PM					
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)							
REQUEST No.	KWT509-REQ-PTT-PQR-R2-12	DATE OF REQ.	JANUARY 13, 2009					
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER							
TESTING M/C	CHUN YEN, CY-604041							
PQR No.	PQR/API/2.375-D-12.75/0.188-T-0.75/Y-42/R2							
SPECIMEN NAME	J3-12-TS-01A	J3-12-TS-02C	-					
AMBIENT TEMP.	28.4 °C	HUMIDITY	44.0 %					
RESULTS OF TENSION TESTING								
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)	Result
1	J3-12-TS-01A	0.38	18,183.28	31,069.50	47,434.90	81,051.32	12.51	PASS
2	J3-12-TS-02C	0.36	16,735.00	28,121.64	46,037.68	77,362.11	7.42	PASS

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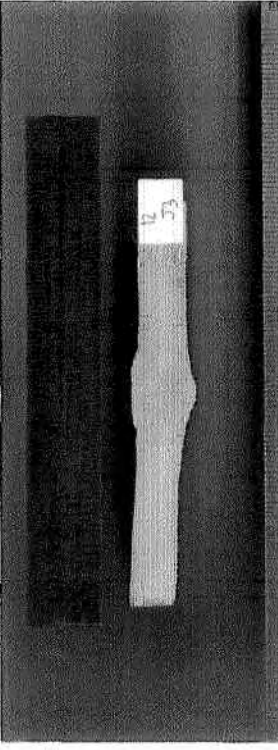
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Our ref : KWT509-PTT-PQR-R2-12



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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	04:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R2-12	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/2.375-D-12.75/0.188-T-0.75/Y-42/R2		
SPECIMEN NAME	J3-12-HV-01A	-	-
AMBIENT TEMP.	28.4 °C	HUMIDITY	44.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

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Our ref : KWT509-PTT-PQR-R2-12



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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	04:00 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R2-12	DATE OF REQ.	JANUARY 13, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/2.375-D-12.75/0.188-T-0.75/Y-42/R2				
SPECIMEN NAME	J3-12-RB-01B	J3-12-RB-02D	J3-12-FB-01B		
AMBIENT TEMP.	28.4 °C	HUMIDITY	44.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (mm)	Roller Distance (mm)	Results (Open indication in any directions)	Remark
1	J3-12-RB-01B	3.5	4.625	NO OPENING INDICATION	PASS
2	J3-12-RB-02D	3.5	4.625	NO OPENING INDICATION	PASS
3	J3-12-FB-01B	3.5	4.625	NO OPENING INDICATION	PASS
4	J3-12-FB-02D	3.5	4.625	NO OPENING INDICATION	PASS

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Tel. +66 2470-9671-3, +66 2470-9664-7 Fax +66 2428-3374 <http://www.kmutt.ac.th>

Our ref : KWT509-PTT-PQR-R2-16GRB

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API12.75-D/0.188-T-0.75/Y-42/R2
(API 5L Gr B \varnothing 16" WELDED PIPE, WITH 2nd REPAIRING)
DATE OF TESTING : JANUARY 13, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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CERTIFIED BY

DESTRUCTIVE TESTING SECTOR MANAGER
OF KMUTT'S WELDING
RESEARCH AND CONSULTING CENTER

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Our ref : KWT509-PTT-PQR-R2-12



ANNEX 5/5
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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	04:00 PM			
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.	KWT509-REQ-PTT-PQR-R2-12	DATE OF REQ.	JANUARY 13, 2009			
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)					
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE				
PQR No.	PQR/API/2.375-D-12.75/0.188-T-0.75/Y-42/R2					
SPECIMEN NAME	J3-12-HV-01B	TESTING METHOD	VICKER'S (10 kg)			
AMBIENT TEMP.	28.4 °C	HUMIDITY	44.0 %			
TEST LOCATION						
RESULTS OF VICKER'S HARDNESS TESTING						
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	1	169	4	200	7	212
	2	175	5	209	8	216
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	16	172	19	-	22	217
	17	175	20	-	23	216
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	18	171	21	-	24	214
	19	171	21	-	24	214

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Our ref : KW1509-PTT-PQR-R2-16GRB



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NICK-BREAK TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	02:30 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWTS09-REQ-PTT-PQR-R2-16GRB	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING M/C	100 TONS PRESSING MACHINE		
PQR No.	PQR/API12.75-D10.188-T-0.75/Y-42/R2		
SPECIMEN NAME	J3-16GRB-NB-01A	J3-16GRB-NB-02B	J3-16GRB-NB-03C
AMBIENT TEMP.	25.0 °C	HUMIDITY	52.0 %

RESULTS OF NICK-BREAK TESTING				
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result
1	J3-16GRB-NB-01A	2 ends Support	NO OPENING INDICATION	PASS
2	J3-16GRB-NB-02B	2 ends Support	NO OPENING INDICATION	PASS
3	J3-16GRB-NB-03C	2 ends Support	NO OPENING INDICATION	PASS
4	J3-16GRB-NB-04D	2 ends Support	NO OPENING INDICATION	PASS

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Our ref : KW1509-PTT-PQR-R2-16GRB



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TENSION TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	02:30 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWTS09-REQ-PTT-PQR-R2-16GRB	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING M/C	CHUN YEN, CY-604041		
PQR No.	PQR/API12.75-D10.188-T-0.75/Y-42/R2		
SPECIMEN NAME	J3-16GRB-TS-01A	J3-16GRB-TS-02B	J3-16GRB-TS-03C
AMBIENT TEMP.	25.0 °C	HUMIDITY	52.0 %

RESULTS OF TENSION TESTING								
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)	Result
1	J3-16GRB-TS-01A	0.35	22,864.51	26,867.24	66,164.03	77,746.88	20.88	PASS
2	J3-16GRB-TS-02B	0.34	23,121.09	27,374.69	67,220.07	79,586.57	15.85	PASS
3	J3-16GRB-TS-03C	0.37	24,512.35	28,726.04	66,072.23	77,430.10	26.48	PASS
4	J3-16GRB-TS-04D	0.35	22,676.34	28,121.64	63,897.05	79,240.75	19.54	PASS

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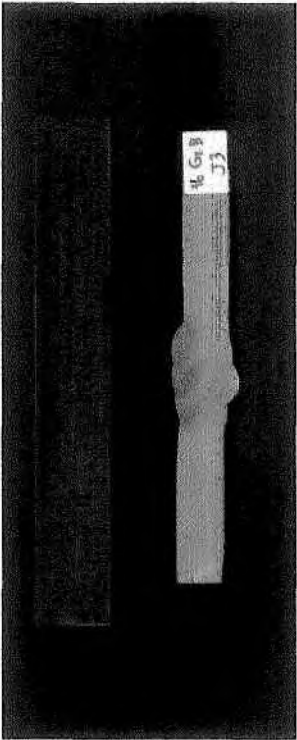
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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	02:30 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R2-16GRB	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/12.75-D/0.188-T-0.75/Y-42/R2		
SPECIMEN NAME	J3-16GRB-HV-01A		
AMBIENT TEMP.	25.0 °C	HUMIDITY	52.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	02:30 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R2-16GRB	DATE OF REQ.	JANUARY 13, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/12.75-D/0.188-T-0.75/Y-42/R2				
SPECIMEN NAME	J3-16GRB-FB-01A	J3-16GRB-FB-02B	J3-16GRB-RB-02B		
	J3-16GRB-FB-03C	J3-16GRB-RB-03C	J3-16GRB-RB-04D		
AMBIENT TEMP.	25.0 °C	HUMIDITY	52.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (mm)	Roller Distance (mm)	Results (Open indication in any directions)	Remark
1	J3-16GRB-FB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J3-16GRB-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
3	J3-16GRB-FB-02B	3.5	4.625	NO OPENING INDICATION	PASS
4	J3-16GRB-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS
5	J3-16GRB-FB-03C	3.5	4.625	NO OPENING INDICATION	PASS
6	J3-16GRB-RB-03C	3.5	4.625	NO OPENING INDICATION	PASS
7	J3-16GRB-FB-04D	3.5	4.625	NO OPENING INDICATION	PASS
8	J3-16GRB-RB-04D	3.5	4.625	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R2-34

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API12.75-D/0.188-T-0.75/42-Y-65/R2
(API 5L 34" WELDED PIPE, WITH 2nd REPAIRING)
DATE OF TESTING : FEBRUARY 2, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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Our ref : KWT509-PTT-PQR-R2-16GRB

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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	02:30 PM			
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)					
REQUEST No.	KWT509-REQ-PTT-PQR-R2-16GRB	DATE OF REQ.	JANUARY 13, 2009			
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER					
TESTING M/C	LAIZHOU HUAYIN: HV-50A (S/N: 0056)					
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE				
PQR No.	PQR/API12.75-D/0.188-T-0.75/Y-42/R2					
SPECIMEN NAME	J3-16GRB-HV-01B	TESTING METHOD	VICKER'S (10 kg)			
AMBIENT TEMP.	25.0 °C	HUMIDITY	52.0 %			
TEST LOCATION						
RESULTS OF VICKER'S HARDNESS TESTING						
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	1	171	4	185	7	205
	2	171	5	186	8	204
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	16	179	19	-	22	207
	17	182	20	-	23	203
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	18	172	21	-	24	209
	19	172	22	-	25	207
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	20	172	23	-	26	203
	21	172	24	-	27	209
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	22	172	25	-	28	207
	23	172	26	-	29	203
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE	
	No.	HV10	No.	HV10	No.	
	24	172	27	-	30	209
	25	172	28	-	31	207

TESTED BY

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Our ref : KWT509-PTT-PQR-R2-34



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NICK-BREAK TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	03:00 PM	
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)			
REQUEST No.	KWT509-REQ-PTT-PQR-R2-34	DATE OF REQ.	FEBRUARY 2, 2009	
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER			
TESTING M/C	100 TONS PRESSING MACHINE			
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R2			
SPECIMEN NAME	J3-34-NB-01A	J3-34-NB-02B	J3-34-NB-03C	
AMBIENT TEMP.	25.8 °C	HUMIDITY	42 %	
RESULTS OF NICK-BREAK TESTING				
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result
1	J3-34-NB-01A	2 ends Support	NO OPENING INDICATION	PASS
2	J3-34-NB-02B	2 ends Support	NO OPENING INDICATION	PASS
3	J3-34-NB-03C	2 ends Support	NO OPENING INDICATION	PASS
4	J3-34-NB-04D	2 ends Support	NO OPENING INDICATION	PASS

TESTED BY

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TENSION TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	03:00 PM					
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)							
REQUEST No.	KWT509-REQ-PTT-PQR-R2-34	DATE OF REQ.	FEBRUARY 2, 2009					
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER							
TESTING M/C	CHUN YEN, CY-604041							
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R2							
SPECIMEN NAME	J3-34-TS-01A	J3-34-TS-02B	J3-34-TS-03C					
AMBIENT TEMP.	25.8 °C	HUMIDITY	42 %					
RESULTS OF TENSION TESTING								
No.	Specimen Name	Area (in ²)	Yield Load (lbF)	Max Load (lbF)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)	Result
1	J3-34-TS-01A	0.61	38,658.70	47,622.05	63,183.49	77,833.11	24.5	PASS
2	J3-34-TS-02B	0.62	37,147.71	46,498.77	60,350.07	75,541.78	26	PASS
3	J3-34-TS-03C	0.61	38,778.44	46,481.69	63,549.84	76,173.86	24.25	PASS
4	J3-34-TS-04D	0.60	37,524.03	45,472.44	62,381.48	75,595.24	24.63	PASS

TESTED BY

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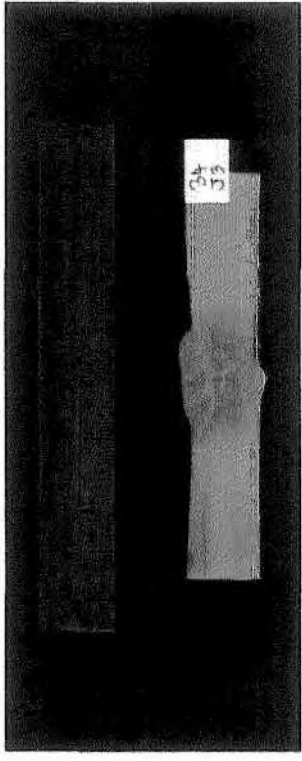
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Our ref : KWT509-PTT-PQR-R2-34



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THAILAND, Tel 662-470-9674, Fax 662-470-9710

MACROSTRUCTURE TESTING REPORT

DATE OF TESTING:	FEBRUARY 2, 2009	TIME OF TESTING	03:00 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWT509-REQ-PTT-PQR-R2-34	DATE OF REQ.	FEBRUARY 2, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE #240 - #500 SANDPAPER MANUALLY GRINDED		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R2		
SPECIMEN NAME	J3-34-HV-01A		-
AMBIENT TEMP.	25.8 °C	HUMIDITY	42 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

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GUIDED-BEND TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	03:00 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWT509-REQ-PTT-PQR-R2-34	DATE OF REQ.	FEBRUARY 2, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/12.75-D/0.188-T-0.75/42-Y-65/R2				
SPECIMEN NAME	J3-34-FB-01A	J3-34-RB-01A	J3-34-FB-02B		
	J3-34-FB-03C	J3-34-RB-03C	J3-34-FB-04D		
AMBIENT TEMP.	25.8 °C	HUMIDITY	42 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J3-34-FB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J3-34-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
3	J3-34-FB-02B	3.5	4.625	NO OPENING INDICATION	PASS
4	J3-34-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS
5	J3-34-FB-03C	3.5	4.625	NO OPENING INDICATION	PASS
6	J3-34-RB-03C	3.5	4.625	NO OPENING INDICATION	PASS
7	J3-34-FB-04D	3.5	4.625	NO OPENING INDICATION	PASS
8	J3-34-RB-04D	3.5	4.625	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R2-16X65

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API12.75-D0.188-T-0.75/65-Y/R2
(API 5L X65 16" WELDED PIPE, WITH 2nd REPAIRING)
DATE OF TESTING : JANUARY 13, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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INSPECTED BY

CERTIFIED BY

DESTRUCTIVE TESTING SECTOR MANAGER
OF KMUTT'S WELDING
RESEARCH AND CONSULTING CENTER

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Our ref : KWT509-PTT-PQR-R2-34



ANNEX 5/5
KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
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THAILAND, Tel 662-470-9674, Fax 662-470-9710

VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	FEBRUARY 2, 2009	TIME OF TESTING	03:00 PM							
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)									
REQUEST No.	KWT509-REQ-PTT-PQR-R2-34	DATE OF REQ.	FEBRUARY 2, 2009							
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER									
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (SN: 0056)									
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE								
PQR No.	PQR/API12.75-D0.188-T-0.75/42-Y-65/R2									
SPECIMEN NAME	J3-34-HV-01B	TESTING METHOD	VICKER'S (10 kg)							
AMBIENT TEMP.	25.8 °C	HUMIDITY	42 %							
TEST LOCATION										
RESULTS OF VICKER'S HARDNESS TESTING										
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE					
	No.	HV10	No.	HV10	No.	HV10				
	1	164	4	182	7	205	10	191	13	174
	2	163	5	193	8	203	11	187	14	170
LAYER 2	3	168	6	190	9	209	12	185	15	173
	BASE	HAZ	WELD METAL	HAZ	BASE					
	No.	HV10	No.	HV10	No.	HV10	No.	HV10	No.	HV10
	16	171	19	189	22	211	25	188	28	168
17	175	20	190	23	203	26	185	29	169	
	18	166	21	192	24	218	27	190	30	173

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Our ref : KWT509-PTT-PQR-R2-16X65



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NICK-BREAK TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:15 PM	
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)			
REQUEST No.	KWT509-REQ-PTT-PQR-R2-16X65	DATE OF REQ.	JANUARY 13, 2009	
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER			
TESTING M/C	100 TONS PRESSING MACHINE			
PQR No.	PQR/API/12.75-D/0.188-T-0.75/65-Y/R2			
SPECIMEN NAME	J3-16X65-NB-01A	J3-16X65-NB-02B	J3-16X65-NB-03C	
			J3-16X65-NB-04D	
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %	
RESULTS OF NICK-BREAK TESTING				
No.	Specimen Name	Method of Breaking	Results (Open indication in any directions)	Result
1	J3-16 X65-NB-01A	2 ends Support	NO OPENING INDICATION	PASS
2	J3-16 X65-NB-02B	2 ends Support	NO OPENING INDICATION	PASS
3	J3-16 X65-NB-03C	2 ends Support	NO OPENING INDICATION	PASS
4	J3-16 X65-NB-04D	2 ends Support	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R2-16X65



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TENSION TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:15 PM					
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)							
REQUEST No.	KWT509-REQ-PTT-PQR-R2-16X65	DATE OF REQ.	JANUARY 13, 2009					
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER							
TESTING M/C	CHUN YEN, CY-604041							
PQR No.	PQR/API/12.75-D/0.188-T-0.75/65-Y/R2							
SPECIMEN NAME	J3-16X65-TS-01A	J3-16 X65-TS-02B	J3-16 X65-TS-03C					
			J3-16 X65-TS-04D					
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %					
RESULTS OF TENSION TESTING								
No.	Specimen Name	Area (in ²)	Yield Load (lbf)	Max Load (lbf)	Yield Stress (psi)	Max Stress (psi)	Elong. (%)	Result
1	J3-16X65-TS-01A	0.36	29,587.02	33,960.35	81,078.72	93,063.17	20.5	PASS
2	J3-16 X65-TS-02B	0.37	30,516.43	35,112.13	83,444.87	96,011.47	22.02	PASS
3	J3-16 X65-TS-03C	0.37	31,571.27	35,420.04	86,194.08	96,701.77	22.92	PASS
4	J3-16 X65-TS-04D	0.37	30,898.44	35,169.17	83,383.28	94,908.36	25.3	PASS

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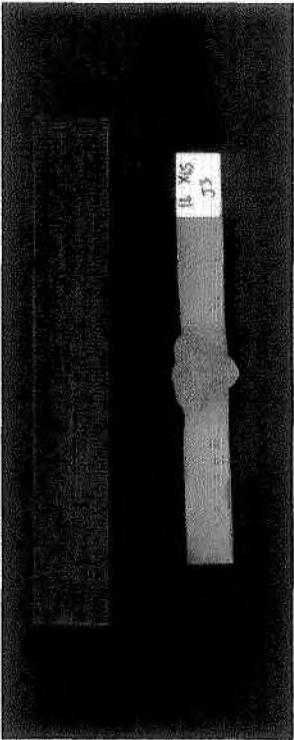
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MACROSTRUCTURE TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:15 PM
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)		
REQUEST No.	KWTS09-REQ-PTT-PQR-R2-16X65	DATE OF REQ.	JANUARY 13, 2009
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER		
TESTING TECHNIQUE	FLATTENING & ROUGH GRINDING		
SURFACE PREPARATION	FLATTENING WITH #180 SANDBELT MACHINE #240 - #500 SANDPAPER MANUALLY GRINDING		
ETCHANT	NITAL ACID 30%	ETCHING TIME	15 SEC
PQR No.	PQR/API/12.75-D/0.188-T-0.75/65-Y/R2		
SPECIMEN NAME	J3-16X65-HV-01A		
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %
RESULTS OF MACROSTRUCTURE TESTING			
			
COMMENTS	COMPLETE		

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Our ref : KWT509-PTT-PQR-R2-16X65



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GUIDED-BEND TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:15 PM		
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)				
REQUEST No.	KWTS09-REQ-PTT-PQR-R2-16X65	DATE OF REQ.	JANUARY 13, 2009		
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER				
TESTING M/C	100 TONS PRESSING MACHINE				
PQR No.	PQR/API/12.75-D/0.188-T-0.75/65-Y/R2				
SPECIMEN NAME	J3-16X65-FB-01A	J3-16 X65-RB-01A	J3-16 X65-FB-02B		
	J3-16 X65-FB-03C	J3-16 X65-RB-03C	J3-16 X65-FB-04D		
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %		
RESULTS OF GUIDED-BEND TESTING					
No.	Specimen Name	Punch Diameter (in)	Roller Distance (in)	Results (Open indication in any directions)	Remark
1	J3-16X65-FB-01A	3.5	4.625	NO OPENING INDICATION	PASS
2	J3-16 X65-RB-01A	3.5	4.625	NO OPENING INDICATION	PASS
3	J3-16 X65-FB-02B	3.5	4.625	NO OPENING INDICATION	PASS
4	J3-16 X65-RB-02B	3.5	4.625	NO OPENING INDICATION	PASS
5	J3-16 X65-FB-03C	3.5	4.625	NO OPENING INDICATION	PASS
6	J3-16 X65-RB-03C	3.5	4.625	NO OPENING INDICATION	PASS
7	J3-16 X65-FB-04D	3.5	4.625	NO OPENING INDICATION	PASS
8	J3-16 X65-RB-04D	3.5	4.625	NO OPENING INDICATION	PASS

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Our ref : KWT509-PTT-PQR-R2-42

CERTIFICATE OF TESTING

CLIENT : ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)
PLACE OF TESTING : KMUTT'S WELDING RESEARCH AND CONSULTING CENTER
SUBJECT : PQR TEST
CODE OR STANDARD : API 1104 (2005)
SPECIMEN NAME : PQR/API12.75-D/0.75-T/65-Y/R2
(API 5L 42" WELDED PIPE, WITH 2nd REPAIRING)
DATE OF TESTING : FEBRUARY 2, 2009

OUR REPORT AS FOLLOW :

1. TENSION TESTING REPORT
2. NICK-BREAK TESTING REPORT
3. GUIDED-BEND TESTING REPORT
4. MACRO STRUCTURE TESTING REPORT
5. VICKER'S HARDNESS TESTING REPORT

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VICKER'S HARDNESS TESTING REPORT

DATE OF TESTING	JANUARY 13, 2009	TIME OF TESTING	01:15 PM							
CLIENT	ALLIANCE PLANT SERVICES (UNDER SUPERVISIONS OF PTT PCL.)									
REQUEST No.	KWT509-REQ-PTT-PQR-R2-16X65	DATE OF REQ.	JANUARY 13, 2009							
PLACE OF TEST	KMUTT'S WELDING RESEARCH AND CONSULTING CENTER									
TESTING M/C	LAI ZHOU HUAYIN: HV-50A (S/N: 0056)									
STD. TEST PIECE	V200503-22 (712.0 HV)	AVG. CAL. VALUE								
PQR No.	PQR/API12.75-D/0.188-T-0.75/65-Y/R2									
SPECIMEN NAME	J3-16X65-HV-01B	TESTING METHOD	VICKER'S (10 kg)							
AMBIENT TEMP.	25.2 °C	HUMIDITY	56.0 %							
TEST LOCATION										
RESULTS OF VICKER'S HARDNESS TESTING										
LAYER 1	BASE	HAZ	WELD METAL	HAZ	BASE					
	No.	HV10	No.	HV10	No.					
	1	207	4	217	7	225	10	214	13	207
	2	206	5	216	8	223	11	212	14	210
3	207	6	215	9	226	12	216	15	206	
LAYER 2	BASE	HAZ	WELD METAL	HAZ	BASE					
	No.	HV10	No.	HV10	No.					
	16	209	19	-	22	221	25	-	28	203
	17	209	20	-	23	225	26	-	29	207
18	210	21	-	24	225	27	-	30	210	

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