



P.M.S CO., LTD
'Pioneer Manufacturing & Supply'

711 Byucksan digital valley, #303, Daedong-ro,
 Sasang-ku, Busan, Korea
 TEL : 82-51-713-8300 FAX : 82-51-713-8397

CERTIFICATE LIST

Client : FARNIKAN	Date : 2024. 10. 31
Project : HX-127	Ref. No. :
Shipper : P.M.S	P/O. No. : PMS-24-050

- DESCRIPTION : U-TUBE, SPACER

APPLICATION NO. : T-402

*** ENCLOSED CERTIFICATE**

		PAGE	Ref. No.
Inspection Item List (T-402)	-----	(1)	()
1. U-TUBE, SPACER			
1) Inspection Certificate	-----	(2)	()
2) Heat Treatment Report	-----	(3~4)	()
3) Dimension Check Sheet	-----	(5~7)	()

*** REMARKS**

결	담당	팀장	이사	전무	사장
재					

INSPECTION REPORT



Pioneer Manufacturing & Supply
P.M.S CO., LTD

Address : #711 Byucksan Digital Valley
132-7 Gamjeon-Dong, Sasang-Ku, Busan, Korea

REPORT NO. : T- 402 (PMS-24-050)

CUSTOMER : FARNIKAN

PROJECT NO. : HX-127

INSPECTION DATE : 2024. 10. 31

No.	ITEM	Material	Description	Q'ty	Heat No. (Lot No.)	Remark
1	U-TUBE	SA334 GR.6	OD 19.05 x Avg.1.65Tx 2305U	379	B1-2313351 (YC241010-01)	R35.7~R273.7
2	SPACER	SA334 GR.6	OD 19.05 x Avg.1.65Tx 558L	12	B1-2313351	
3	SPACER	SA334 GR.6	OD 19.05 x Avg.1.65Tx 538L	36	B1-2313351	
TOTAL				427		

Visual & Dimension Inspection



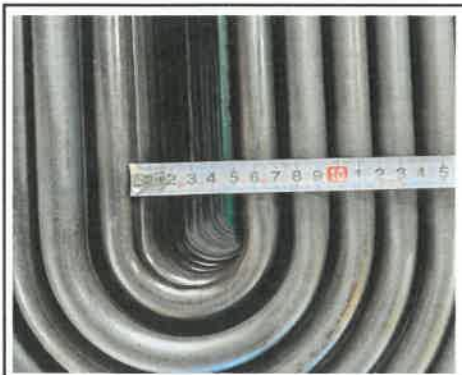
U-TUBE



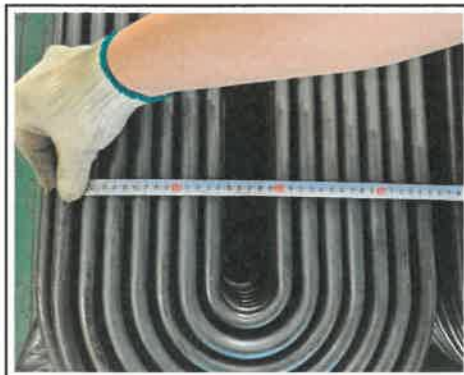
U-TUBE



U-TUBE



U-TUBE



U-TUBE



U-TUBE



U-TUBE



U-TUBE



U-TUBE



U-TUBE



U-TUBE



SPACER



SPACER



SPACER



SPACER

Result	Visual	Good
	Dimension	Good

Remark	
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INSPECTED BY :	APPROVED BY: 
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Pioneer Manufacturing & Supply

Inspection Item List

FPA/ HX-127

T- 402

No.	Equip.	Item	Material	Size				Q'ty	Heat No. (Lot No.)	Remark
				OD	Avg.T	STL	R			
1	HX-127	U-BENDING TUBE	SA334 Gr.6	19.05	1.65	2,305	35.7~ 273.7	379	B1-2313351 (YC241010-01)	
2	HX-127	SPACER	SA334 Gr.6	OD19.05 x 1.65T x 558L				12	B1-2313351	
3	HX-127	SPACER	SA334 Gr.6	OD19.05 x 1.65T x 538L				36	B1-2313351	
TOTAL								427		


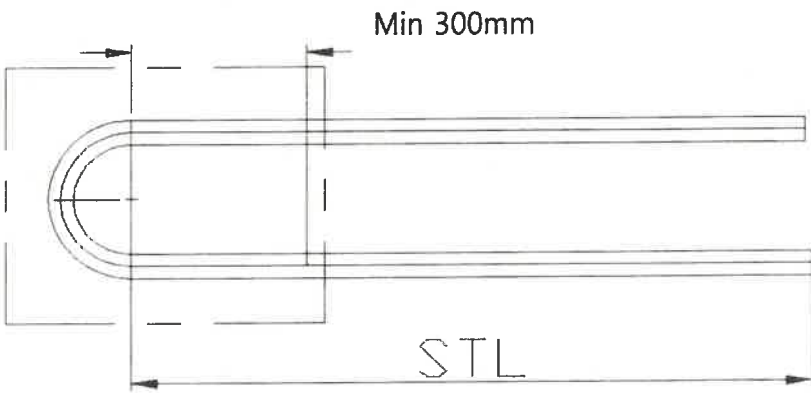


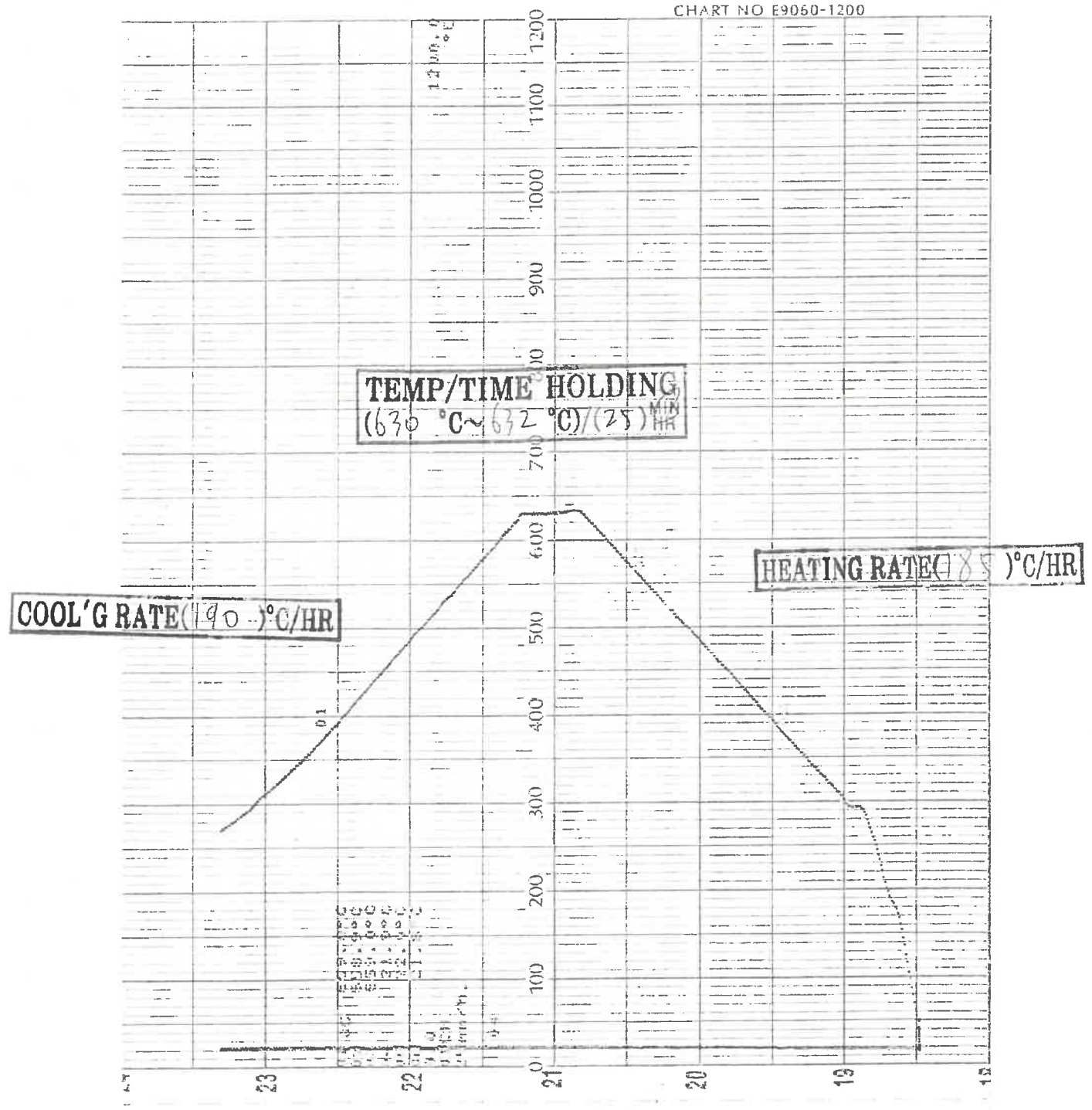
	HEAT TREATMENT REPORT						
CUSTOMER	P M S	DATE	2024. 10. 28				
JOB NO	24-050-04	REPORT NO.	HT - PMS				
PROJECT NAME		MATERIAL	SA334 - Gr.6				
ITEM NAME	U-TUBE	DESCRIPTION	19.05x1.65Tx2305 STL				
RECORD NO	YOKOGAWA437006 / T7006UA306	QUANTITY	379 Q'TY				
TYPE OF HEAT TREATMENT	<input checked="" type="checkbox"/> POST FORMING/BENDING <input type="checkbox"/> POST WELD <input type="checkbox"/> BEFORE WELD						
TREATMENT	<input checked="" type="checkbox"/> S/R <input type="checkbox"/> QUENCHING <input type="checkbox"/> TEMPERING <input type="checkbox"/> P.W.H.T						
TYPE OF THERMOCOUPLE		<input checked="" type="checkbox"/> ALUMEL - CHROMEL <input type="checkbox"/> OTHERS					
HEAT TREATMENT CONDITION							
CONDITION		SPECIFICATION	ACTUAL				
1. LOADING TEMPERATURE(부하온도)		300°C	290°C				
2. HEATING RATE(가열율) Max		Max.220°C / Hr	185°C / Hr				
3. HOLDING TEMPERATURE(유지온도)		600°C~650°C	630°C ~ 632°C				
3. HOLDING TEME(유지시간) Min		15 min	25 min				
4. COOLING RATE(냉각율) Max		278°C / Hr	190°C / Hr				
5. UNLOADING TEMPERATURE(추출온도)		UNDER 300°C	270°C				
6. HEAT SOURCE(가열원)		ELECTRIC LOCAL					
7. CHART NO.	E9060-1200	8. CHART SPEED	25mm / H				
9. Heat Treatment in accordance with DWG NO		WOOJOO STANDARD ITP					
LOCATION OF THERMOCOUPLE <div style="text-align: center; margin-top: 10px;">  </div>							
RESULT : <div style="margin-top: 10px;"> <table border="1" style="border-collapse: collapse; width: 100%;"> <tr> <td style="text-align: center;">PMS</td> <td style="text-align: center;"><input type="checkbox"/> WITNESSED BY</td> </tr> <tr> <td style="text-align: center;">Q.A</td> <td style="text-align: center;"><input checked="" type="checkbox"/> REVIEWED BY</td> </tr> </table> <div style="text-align: right; margin-top: 5px;">  </div> </div>		PMS	<input type="checkbox"/> WITNESSED BY	Q.A	<input checked="" type="checkbox"/> REVIEWED BY	INSPECTED BY WOOJOO QUALITY CONTROL Co.,LTD <div style="text-align: center; margin-top: 10px;">  Manager S.Y. Moon </div>	
PMS	<input type="checkbox"/> WITNESSED BY						
Q.A	<input checked="" type="checkbox"/> REVIEWED BY						
CUSTOMER OR AUTHORIZED INSPECTOR		WOOJOO QUALITY CONTROL DEPARTMENT					








CHART NO E9060-1200




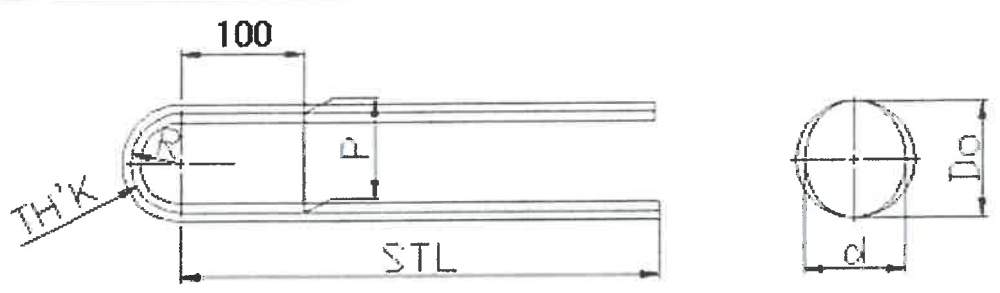
RECORD OF HEAT TREATMENT	
CUSTOMER	PMS
SIZE	19.05 x 1.65 T x 2305 STL
TEMP & HOLDING	670 °C ~ 632 °C / 25 MIN
DATE	2024.10.26
LOT NO	HT-PMS

PMS	<input type="checkbox"/> WITNESSED BY
Q.A.	<input checked="" type="checkbox"/> REVIEWED BY
	<i>[Signature]</i>

4


	TEST REPORT (Ovality & Wall Thickness)																						
CUSTOMER	P M S	DATE	2024. 10. 16																				
JOB NO	24-050-04	MATERIAL	SA334 - Gr.6																				
PROJECT NAME		DESCRIPTION	19.05X1.65(Avg)T R35.7																				
ITEM NAME	U-TUBE	QUANTITY	1 Q'TY																				
<p>* TEMA RCB-2.3</p> <ul style="list-style-type: none"> - Ovality at the bend shall not exceed 10% of the nominal tube outside diameter. - Tube wall thinning in the bends should not exceed a nominal 17% of original tube wall thickness. 																							
<p>Ovality : $\frac{\text{Max. O.D} - \text{Min. O.D}}{\text{Specified. O.D}} \times 100$</p>																							
<p>Wall Thickness : $\frac{\text{Max. Wall Th'k} - \text{Min. Wall Th'k}}{\text{Specified. Wall Th'k}} \times 100$</p>																							
DESCRIPTION		① 45°	② 90°	③ 135°	REMARK																		
Ovality (10%)	Max. O.D	19.10	19.17	19.08																			
	Min. O.D	17.57	17.73	17.69																			
	RESULT	8.03%	7.56%	7.30%																			
		ACCEPT	ACCEPT	ACCEPT																			
Wall Thickness (17%)	Max. Wall Th'k	1.65	1.65	1.65																			
	Min. Wall Th'k	1.36	1.37	1.37																			
	RESULT	13.74%	13.27%	13.27%																			
		ACCEPT	ACCEPT	ACCEPT																			
RESULT	<table border="1"> <tr> <td>PMS</td> <td><input type="checkbox"/> WITNESSED BY</td> <td colspan="3">INSPECTED BY</td> <td>WOJOO BEN-TECH Co., LTD</td> </tr> <tr> <td>Q.A</td> <td><input checked="" type="checkbox"/> REVIEWED BY</td> <td colspan="3" style="text-align: center;"></td> <td style="text-align: center;"></td> </tr> <tr> <td colspan="2"></td> <td colspan="3"></td> <td style="text-align: center;">Manager S.Y. Min...</td> </tr> </table>					PMS	<input type="checkbox"/> WITNESSED BY	INSPECTED BY			WOJOO BEN-TECH Co., LTD	Q.A	<input checked="" type="checkbox"/> REVIEWED BY										Manager S.Y. Min...
PMS	<input type="checkbox"/> WITNESSED BY	INSPECTED BY			WOJOO BEN-TECH Co., LTD																		
Q.A	<input checked="" type="checkbox"/> REVIEWED BY																						
					Manager S.Y. Min...																		
CUSTOMER OR AUTHORIZED INSPECTOR		WOJOO QUALITY CONTROL DEPARTMENT																					

	DIMENSION INSPECTION REPORT (1 / 2)		
CUSTOMER	P M S	DATE	2024. 10. 29
JOB NO	24-050-04	MATERIAL	SA334 - Gr.6
PROJECT NAME		DESCRIPTION	19.05x1.65Tx2305 STL
ITEM NAME	U-TUBE	QUANTITY	660 Q'TY



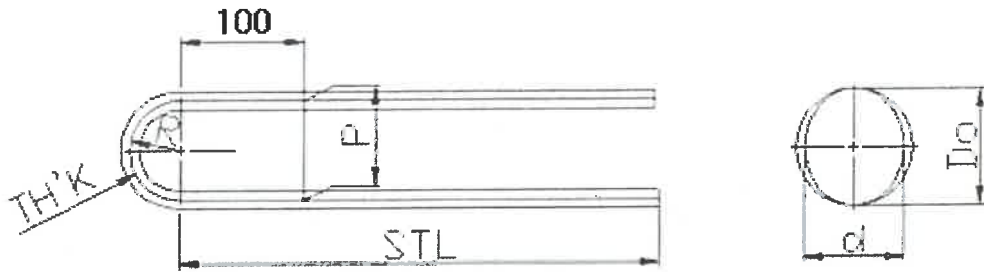
(Unit:mm)

POSITION	RADIUS SPEC (Pitches 95.25 $\pm 1.0\text{ mm}$ 95.25 > <math>\pm 1.5\text{="" math="" mm}<="">)</math>\pm>			STL (-0~+3.2)	U-bend OD Ovality 19.05 (1.905) (10%)			VISUAL	Q'TY
	R	P	ACT	ACT	Do	d	%	Dent Scratch	240
Tag NO									
1	35.7	71.4	72.0	2308	19.17	17.73	7.56	GOOD	20
2	47.6	95.2	96.0	2308	19.25	18.02	6.46	GOOD	20
3	59.5	119.0	119.5	2308	19.20	18.25	4.99	GOOD	20
4	71.4	142.8	143.0	2308	19.12	18.39	3.83	GOOD	20
5	83.3	166.6	166.5	2308	19.15	18.52	3.31	GOOD	20
6	95.2	190.4	190.0	2308	19.11	18.68	2.26	GOOD	20
7	107.1	214.2	215.0	2308	19.16	18.70	2.41	GOOD	20
8	119.0	238.0	238.0	2308	19.10	18.82	1.47	GOOD	20
9	130.9	261.8	262.0	2308	19.14	18.90	1.26	GOOD	20
10	142.8	285.6	285.5	2308	19.10	18.94	0.84	GOOD	20
11	154.7	309.4	309.0	2308	19.12	18.89	1.21	GOOD	20
12	166.6	333.2	333.0	2308	19.13	18.95	0.94	GOOD	20

RESULT	<table border="1"> <tr> <td>PMS</td> <td><input type="checkbox"/> WITNESSED BY</td> </tr> <tr> <td>Q.A</td> <td><input checked="" type="checkbox"/> REVIEWED BY</td> </tr> </table>	PMS	<input type="checkbox"/> WITNESSED BY	Q.A	<input checked="" type="checkbox"/> REVIEWED BY	INSPECTED BY	WOJOO BEN-TECH Co.,LTD  Manager S.Y. Ahn
PMS	<input type="checkbox"/> WITNESSED BY						
Q.A	<input checked="" type="checkbox"/> REVIEWED BY						
CUSTOMER OR AUTHORIZED INSPECTOR	WOJOO QUALITY CONTROL DEPARTMENT						



DIMENSION INSPECTION REPORT (2 / 2)



(Unit:mm)

POSITION	RADIUS SPEC (Pitches 95.25 $\pm 1.0\text{ mm}$ 95.25 > $\pm 1.5\text{ mm}$)			STL (-0~+3.2)	U-bend OD Ovality 19.05 (1.905) (10%)			VISUAL	Q'TY	
	SPEC & TOLE	R	P	ACT	ACT	Do	d	%	Dent Scratch	139
Tag NO										
13	178.5	357.0	357.5	2308	19.12	18.85	1.42	GOOD	20	
14	190.4	380.8	381.0	2308	19.08	18.89	1.00	GOOD	20	
15	202.3	404.6	405.0	2308	19.10	18.93	0.89	GOOD	16	
16	214.2	428.4	428.5	2308	19.17	18.87	1.57	GOOD	20	
17	226.1	452.2	452.0	2308	19.15	18.94	1.10	GOOD	16	
18	238.0	476.0	477.0	2308	19.11	18.91	1.05	GOOD	16	
19	249.9	499.8	500.5	2308	19.20	18.86	1.78	GOOD	12	
20	261.8	523.6	524.0	2308	19.18	18.90	1.47	GOOD	12	
21	273.7	547.4	548.0	2308	19.14	18.95	1.00	GOOD	7	
<div style="border: 2px solid black; border-radius: 15px; padding: 10px; display: inline-block;"> <h1 style="margin: 0;">- BLANK -</h1> </div>										

RESULT

PMS	<input type="checkbox"/> WITNESSED BY
Q.A	<input checked="" type="checkbox"/> REVIEWED BY

[Signature]

INSPECTED BY

WOOJOO BEN-TECH Co.,LTD

[Signature]

Manager S.Y. Moon

CUSTOMER OR AUTHORIZED INSPECTOR

WOOJOO QUALITY CONTROL DEPARTMENT