RMK

TUBE & PIPE

FOR BOILER, HEAT EXCHANGER AND PETROCHEMICAL PLANT

ISO 9001 QUALITY ASSURANCE

ISO 14001 QUALITY ASSURANCE

NDT Level III

RMK Company Limited

Contents

INTRODUCTION

RMK is a producer of a wide range of seamless steel tubes, U-bend tubes, and Finned tubes that are used in a wide variety of applications.

RMK is the RAREMETAL KOREA's sister company which is also involved in steel business for oil and gas sector. RMK is located in Milyang city, South Korea, on a 20,000 square meter area and has ten production units: cold drawing machines, finning machines. This location benefits from being in close sea port to overseas clients.

With long years of manufacturing experience and significant investments, RMK has evolved into a competitive modern Korean company with customers internationally, supported through the worldwide distribution environment.

RMK operates under strict quality, environment as well as health and safety management systems, in compliance with ISO 9001, ISO 14001, ASME U,S,PP stamp and NDE level 3 standard.

The wide product range of RMK meets the requirements of the KS as well as ASTM, ASME, BS, DIN, JIS standards or any other specific customer request.

GENERAL APPLICATIONS

Due to their excellent mechanical and chemical characteristics, the tubes produced by RMK are widely used in the manufacturing of heat exchangers and boilers.

They are suitable also for marine applications, for the defense, petro-chemical, electrical, nuclear & medical industries as well as for car parts.

RMK is specialized in those application field and has enough skilled manposwer to provide technical consultation.

Boiler and heat transmission use

Boiler water tubes, flue pipes, superheat tubes, heat exchangers

Machine Structural Use and Material Piping

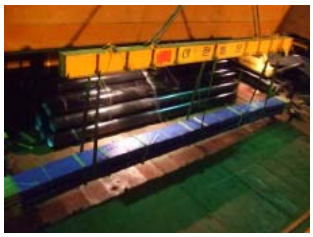
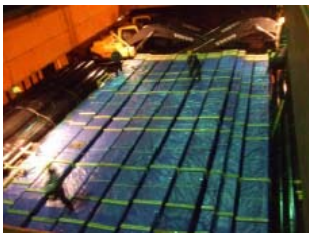
Automotive parts, industrial machinery and transportation part

TUBES FOR HEAT EXCHANGER, BOILER, HRSG, AIR PLAIN, MEDICAL, AUTOMIOTIVE, ELECTRICAL, NUCLEAR

RMK produces seamless tubes maximum 32meter long. Proper packing procedure to deliver long length of tubes are available. Also handling procedure for finned tubes and U-bend tubes are being used in production.

Steel Frame Wooden Wall packing is generally recommended and it prevents from any damages may happen during transportation.




DELIVERY, SAFETY PROCEDURE

STEEL FRAME WOODEN WALL

WOODEN BOX

SEAWORTHY PACKING FOR ALL TYPE

PRODUCTION RANGE

Outside diameter (in)	Outside diameter (mm)	Wall thickness (mm) 1.0	1.2	1.6	1.8	2.0	2.3	2.6	2.9	3.0	3.5	4.0	4.5
	6.0	0.125	0.143	0.715									
	8.0	0.174	0.203	0.255	0.278	0.299							
	10.0	0.224	0.263	0.335	0.368	0.399	0.441						
1/2	12.7	0.291	0.344	0.442	0.489	0.533	0.596						
	13.8	0.319	0.377	0.486	0.538	0.588	0.659	0.725					
	15.0	0.349	0.413	0.534	0.592	0.648	0.728	0.803					
	17.3	0.406	0.481	0.626	0.695	0.762	0.859	0.952	1.040	1.069			
	20.0	0.473	0.562	0.733	0.816	0.897	1.014	1.127	1.235	1.270			
	21.7	0.516	0.613	0.801	0.892	0.981	1.111	1.237	1.358	1.397	1.587	1.764	
1	25.4	0.608	0.723	0.949	1.058	1.166	1.323	1.477	1.625	1.674	1.909	2.132	2.343
	27.2	0.653	0.777	1.020	1.139	1.255	1.427	1.593	1.755	1.808	2.066	2.312	2.545
	29.0	0.697	0.831	1.092	1.220	1.345	1.530	1.710	1.885	1.943	2.223	2.491	2.746
	30.0	0.722	0.861	1.132	1.264	1.395	1.587	1.775	1.958	2.018	2.310	2.591	2.858
	32.0	0.772	0.921	1.212	1.354	1.495	1.702	1.904	2.102	2.167	2.485	2.790	3.083
	34.0	0.822	0.980	1.291	1.444	1.594	1.816	2.034	2.247	2.317	2.659	2.989	3.307
	38.0	0.922	1.100	1.451	1.623	1.794	2.045	2.293	2.536	2.616	3.008	3.388	3.755
1-1/2	38.1	0.924	1.103	1.455	1.628	1.799	2.051	2.299	2.543	2.623	3.017	3.398	3.766
	40.0	0.971	1.160	1.530	1.713	1.893	2.160	2.422	2.680	2.765	3.182	3.587	3.979
	42.7		1.241	1.638	1.834	2.028	2.315	2.597	2.875	2.967	3.418	3.856	4.282
	45.0		1.309	1.730	1.937	2.142	2.446	2.746	3.041	3.139	3.618	4.085	4.540
	48.6		1.417	1.873	2.098	2.322	2.653	2.979	3.301	3.408	3.932	4.444	4.943
	50.0			1.929	2.161	2.391	2.733	3.070	3.402	3.512	4.054	4.583	5.100
2	50.8			1.961	2.197	2.431	2.779	3.122	3.460	3.572	4.124	4.663	5.190
	51.0			1.969	2.206	2.441	2.790	3.135	3.475	3.587	4.141	4.683	5.212
	54.0			2.088	2.341	2.591	2.962	3.329	3.691	3.811	4.403	4.982	5.549
	57.0			2.208	2.475	2.740	3.134	3.523	3.908	4.035	4.664	5.281	5.885
	60.3			2.340	2.623	2.905	3.323	3.737	4.147	4.282	4.952	5.610	6.255
	60.5			2.348	2.632	2.914	3.334	3.750	4.161	4.297	4.970	5.630	6.277
2-1/2	63.5			2.467	2.767	3.064	3.506	3.944	4.378	4.521	5.231	5.929	6.614
	65.0				2.834	3.139	3.592	4.041	4.486	4.633	5.362	6.078	6.782
	70.0				3.058	3.388	3.879	4.365	4.847	5.007	5.798	6.576	7.342
	73.0					3.537	4.051	4.560	5.064	5.231	6.059	6.875	7.679
	75.0					3.637	4.165	4.689	5.208	5.381	6.234	7.074	7.903
3	76.2					3.697	4.234	4.767	5.295	5.470	6.338	7.194	8.037
	76.3					3.702	4.240	4.773	5.302	5.478	6.347	7.204	8.048
	80.0					3.886	4.452	5.013	5.570	5.754	6.670	7.573	8.463
	82.6						4.601	5.181	5.757	5.949	6.896	7.832	8.755
3-1/2	88.9						4.962	5.589	6.213	6.419	7.446	8.459	9.461
	89.1						4.973	5.602	6.227	6.434	7.463	8.479	9.483
	90.0						5.025	5.661	6.292	6.502	7.542	8.569	9.584
	100.0							6.308	7.014	7.249	8.413	9.565	10.705
4	101.6							6.412	7.130	7.368	8.553	9.725	10.884
	110.0								7.737	7.996	9.285	10.562	11.826
	114.3								8.047	8.317	9.660	10.990	12.308
	120.0										10.157	11.558	12.947
	125.0										10.593	12.056	13.507
	130.0										11.029	12.555	14.068
	135.0										11.465	13.053	14.628
	139.8										11.883	13.531	15.166
	145.0										12.337	14.049	15.749
	150.0										12.773	14.547	16.310
	155.0										13.209	15.046	16.870
	160.0										13.644	15.544	17.431
	165.2										14.098	16.062	18.014

(Unit:kg/m)

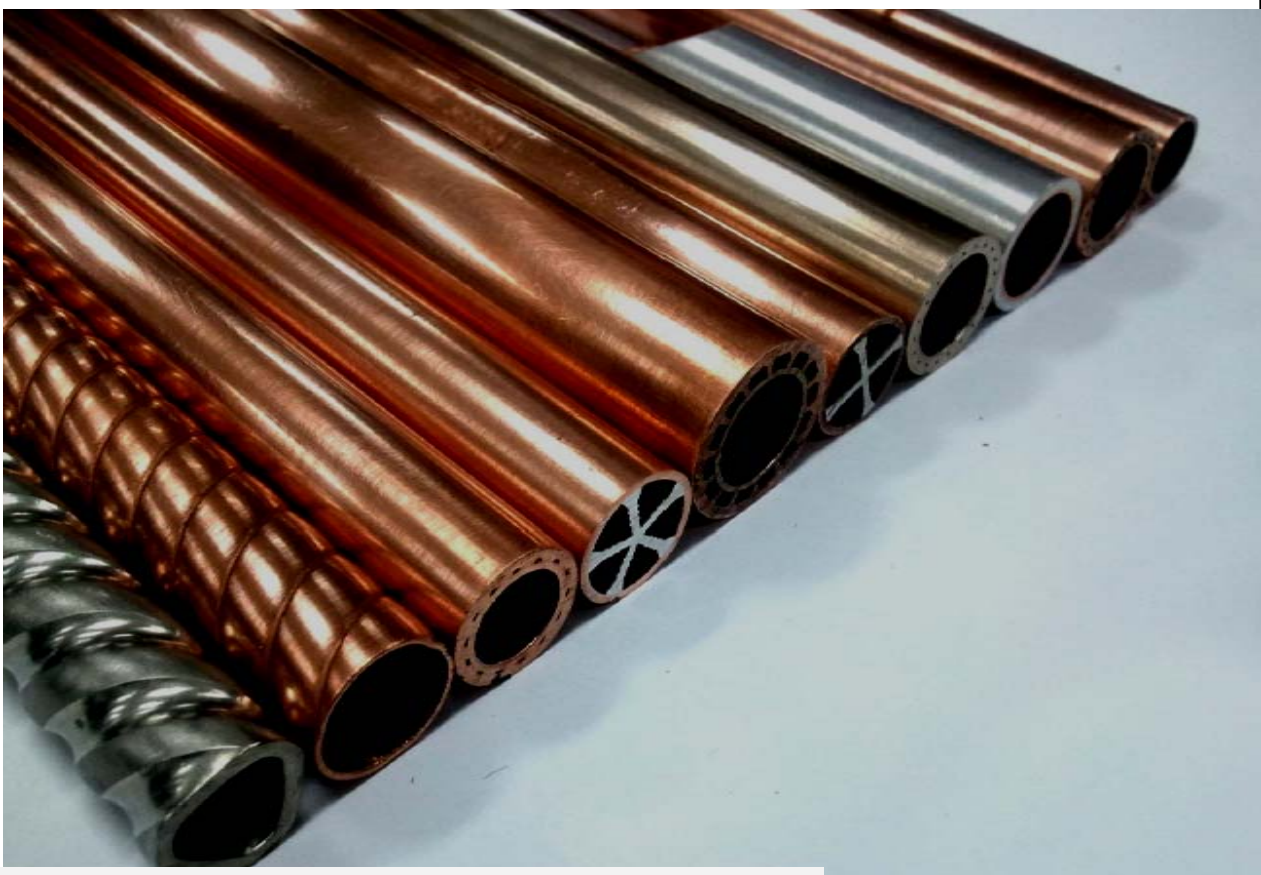
OD 6mm~165.2mm seamless tubes

PRODUCTION RANGE

5.0	5.5	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0	18.0
2.765	2.973													
2.989	3.220													
3.114	3.357	3.587												
3.363	3.631	3.886	4.359											
3.612	3.905	4.185	4.708											
4.110	4.453	4.783	5.405	5.978										
4.123	4.466	4.798	5.423	5.998										
4.359	4.727	5.082	5.754	6.377										
4.696	5.097	5.485	6.225	6.915	7.555									
4.982	5.412	5.829	6.626	7.373	8.071	8.719								
5.430	5.905	6.367	7.254	8.091	8.878	9.615	10.303	10.940						
5.605	6.097	6.576	7.498	8.370	9.192	9.964	10.656	11.359	11.982					
5.704	6.206	6.696	7.637	8.529	9.371	10.163	10.906	11.598	12.241					
5.729	6.234	6.726	7.672	8.569	9.416	10.213	10.960	11.658	12.306					
6.103	6.645	7.174	8.195	9.167	10.089	10.960	11.782	12.555	13.277	13.950	14.572			
6.477	7.056	7.622	8.719	9.765	10.761	11.708	12.604	13.451	14.249	14.996	15.693	16.341		
6.888	7.508	8.116	9.294	10.442	11.501	12.530	13.509	14.438	15.317	16.147	16.926	17.656	18.336	18.996
6.913	7.535	8.146	9.329	10.462	11.546	12.580	13.563	14.498	15.382	16.216	17.001	17.736	18.421	19.056
7.286	7.946	8.594	9.852	11.060	12.218	13.327	14.386	15.394	16.353	17.263	18.122	18.932	19.691	20.401
7.473	8.152	8.818	10.113	11.359	12.555	13.701	14.797	15.843	16.839	17.786	18.683	19.529	20.327	21.074
8.096	8.837	9.565	10.985	12.355	13.676	14.946	16.167	17.337	18.458	19.529	20.551	21.522	22.444	23.316
8.469	9.248	10.014	11.508	12.953	14.348	15.693	16.989	18.234	19.430	20.576	21.672	22.718	23.714	24.661
8.719	9.522	10.313	11.857	13.352	14.797	16.192	17.537	18.832	20.077	21.273	22.419	23.515	24.561	25.558
8.868	9.686	10.492	12.066	13.591	15.066	16.490	17.865	19.191	20.466	21.692	22.867	23.993	25.069	26.096
8.880	9.700	10.507	12.084	13.611	15.088	16.515	17.893	19.221	20.498	21.727	22.905	24.033	25.112	26.141
9.341	10.207	11.060	12.729	14.348	15.917	17.437	18.907	20.327	21.697	23.017	24.287	25.508	26.679	27.800
9.665	10.563	11.449	13.182	14.866	16.500	18.085	19.619	21.104	22.539	23.924	25.259	26.544	27.780	28.965
10.450	11.426	12.390	14.281	16.122	17.913	19.654	21.345	22.987	24.579	26.121	27.613	29.055	30.447	31.790
10.475	11.454	12.420	14.316	16.162	17.958	19.704	21.400	23.047	24.643	26.190	27.687	29.135	30.532	31.880
10.587	11.577	12.555	14.473	16.341	18.159	19.928	21.647	23.316	24.935	26.504	28.024	29.493	30.913	32.283
11.832	12.947	14.049	16.216	18.334	20.401	22.419	24.387	26.305	28.173	29.992	31.760	33.479		
12.032	13.166	14.288	16.495	18.653	20.760	22.818	24.825	26.783	28.691	30.550	32.358			
13.078	14.317	15.544	17.960	20.327	22.643	24.910	27.127	29.294						
13.613	14.906	16.187	18.710	21.183	23.607	25.981	28.305							
14.323	15.687	17.038	19.704	22.319	24.885	27.401	29.867	32.283	34.650	36.966	39.233	41.450	43.617	45.735
14.946	16.372	17.786	20.576	23.316	26.006	28.647	31.237	33.778	36.269	38.710	41.102	43.443	45.735	47.977
15.569	17.057	18.533	21.448	24.312	27.127	29.892	32.607	35.273	37.888	40.454	42.970	45.436	47.852	50.219
16.192	17.742	19.280	22.319	25.309	28.248	31.138	33.977	36.767	39.507	42.198	44.838	47.429	49.969	52.460
16.789	18.400	19.998	23.156	26.265	29.324	32.333	35.292	38.202	41.062	43.871	46.632	49.342	52.002	
17.437	19.112	20.775	24.063	27.301	30.490	33.629	36.717	39.756	42.746	45.685	48.575			
18.060	19.797	21.522	24.935	28.298	31.611	33.874	38.087	41.251	44.365	47.429				
18.683	20.482	22.270	25.807	29.294	32.732	36.120	39.457	42.746						
19.305	21.167	23.017	26.679	30.291	33.853	37.365	10.827							
19.953	21.880	23.794	27.585	31.327	35.018	38.660								

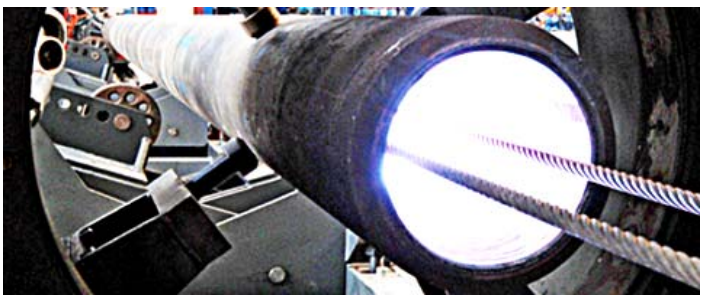
THK 1mm~18mm seamless tubes

CORROSION RESISTANT ALLOY CLAD PIPE



RMK produces extrusion method of a clad pipe into a clad pipe by adequate pressure or by cold drawing.

It has strong advantage to corrosion resistance and it can be used in environment of sour or to gas & oil which is including high value of sulfur and hydrogen.



Aluminum-Copper alloy CRA tubes

Stainless steel-Carbon steel CRA tubes

3layer CRA tubes

AUSTENITIC STAINLESS STEEL TUBE

Material No. TP304, TP304L, TP316, TP316L, TP321, TP321H, TP347, TP347H

Standards ASTM/ASME A/SA213, A/SA249

Surface condition BA, AP available

Maximum hardness HRC26

Heat analysis average CE≤0.23

Product analysis average CE≤0.23

Maximum 20meter long straight tubes, 9.1meter long STL U-bend tubes

SUPER DUPLEX STAINLESS STEEL TUBE

Material No. S32750

Standards ASTM/ASME A/SA789

Combination of properties given by austenitic and ferritic structure

Excellent resistance to Pitting corrosion, Crevice corrosion, SCC

Higher strength properties than conventional austenitic or ferritic grades

Easy to weld

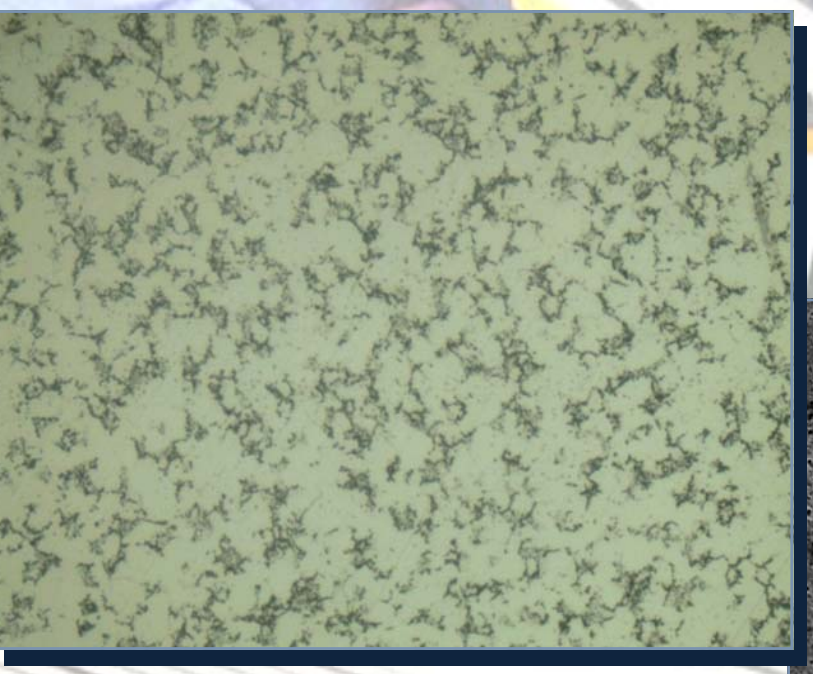
Low thermal expansion, high heat conductivity

High energy absorption, excellent resistance to inorganic acids

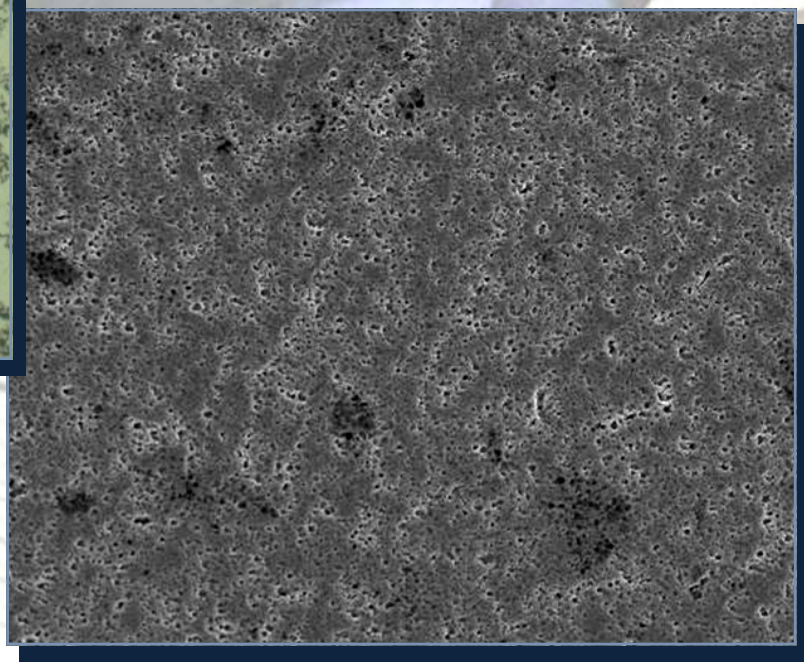
Maximum 20meter long straight tubes, 9.1meter long STL U-bend tubes

MARTENSITIC STAINLESS STEEL TUBE

10% OXALIC ETCHED MICRO STRUCTURE, X200



SEM MICRO STRUCTURE, X1000



Material No. TP410, Standard ASTM/ASME A/SA268

High quality of martensitic stainless steel structure

Average hardness of straight tube and u-bend tubes after heat-treatment HRB86

Maximum 20meter long straight tubes, 9.1meter long STL U-bend tubes

CARBON & ALLOY STEEL TUBE

Material No. T5, T5b, T9, T11, T22, T91

Standard ASTM/ASME A/SA179, A/SA192, A/SA210, A/SA213

Cold drawing tolerance for THK 0~10%, by Pilger mill 0~5%

Maximum hardness HRC22

Heat analysis average CE≤0.23

Product analysis average CE≤0.23

Maximum 20meter long straight tubes, 9.1meter long STL U-bend tubes

COPPER ALLOY TUBE

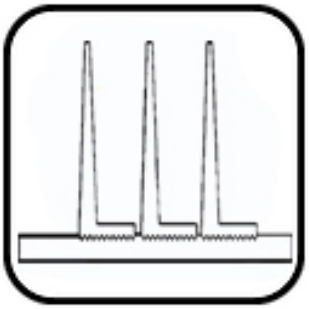
Material No. C44300, C68700, C70600, C71000, C71500,

Standard ASTM/ASME B/SB111, B/SB466

OD 1.5mm~259mm

Maximum 20meter long straight tubes, 9.1meter long STL U-bend tubes

FINNED TUBE



LL FIN TYPE

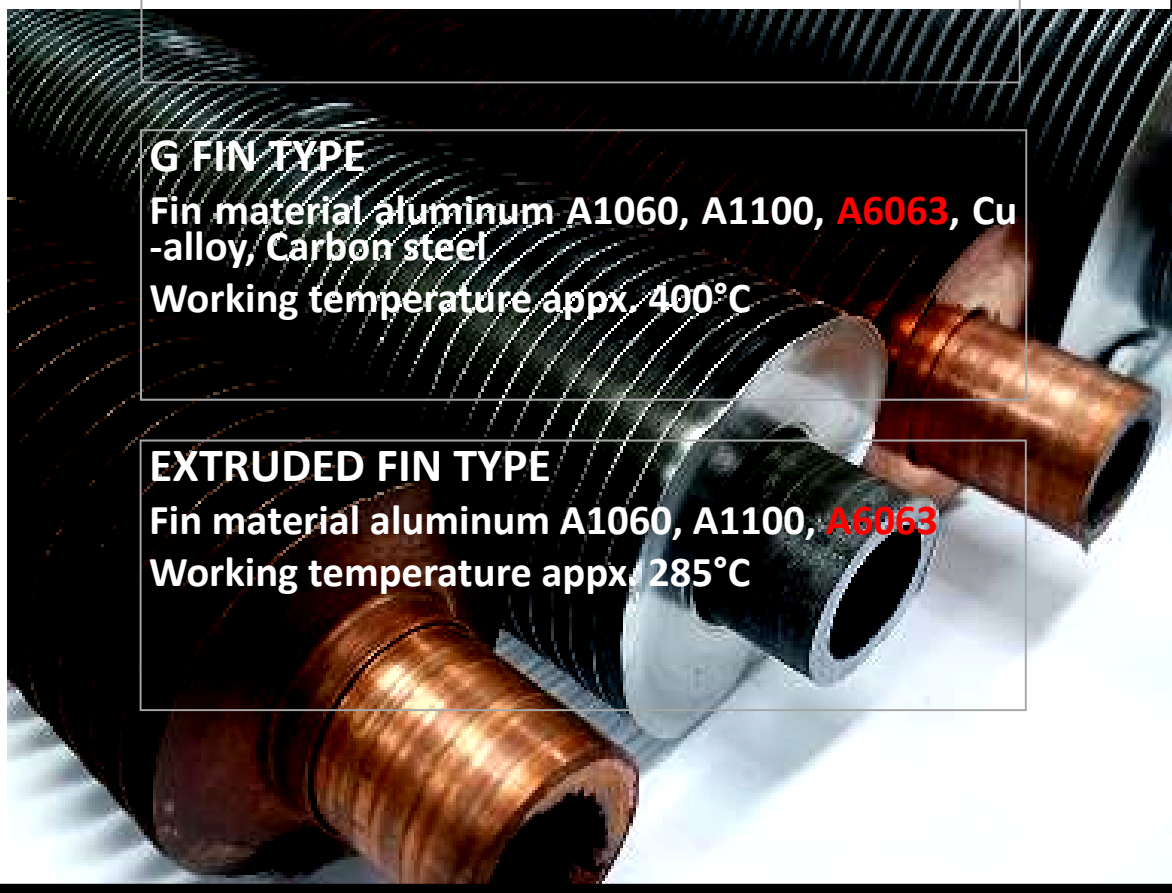
Fin material aluminum A1060, A1100, Cu-alloy
Working temperature appx. 400°C

L FIN TYPE

Fin material aluminum A1060, A1100, Cu-alloy
Working temperature appx. 180°C

KL FIN TYPE

Fin material aluminum A1060, A1100, Cu-alloy
Working temperature appx. 260°C



G FIN TYPE

Fin material aluminum A1060, A1100, A6063, Cu-alloy, Carbon steel
Working temperature appx. 400°C

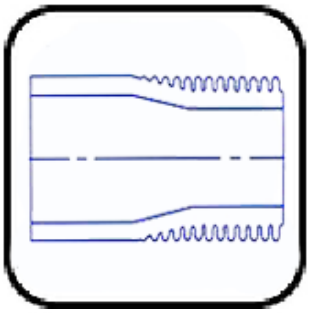
EXTRUDED FIN TYPE

Fin material aluminum A1060, A1100, A6063
Working temperature appx. 285°C

Available A6063 finned tubes only in RMK Tube

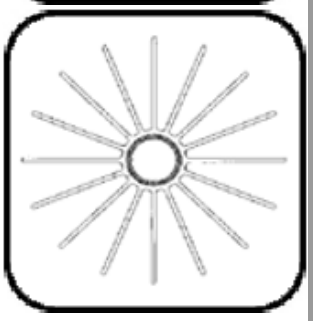
G fin minimum 8.8 Lbs (4kg) pulling resistance guaranteed

FINNED TUBE



LOW FIN TYPE
Material unlimited
12.75~38.1mmOD, 19~36FPI, 0.7~1.6mm Fin H

HIGH FIN TYPE
Material unlimited
15.88~22.23mmOD, 7~9FPI



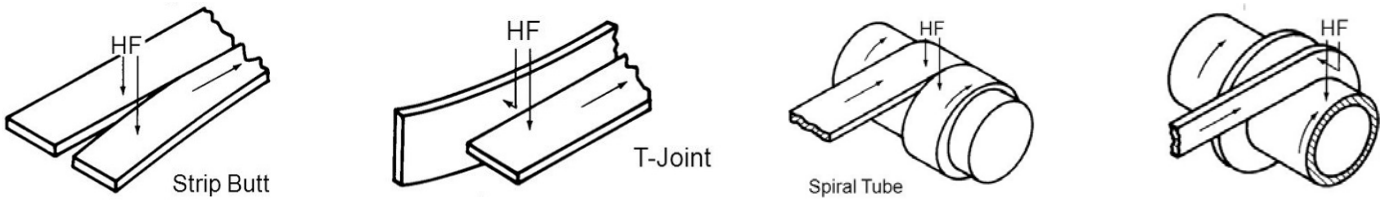
LONGITUDINAL FIN TYPE
Fin material A1008, Copper alloy
15.88~273.05mmOD, 0.89~1.27Fin THK
Resistance weld

Heat is transferred between the fluid passing through the bore of the finned tube and the fluid passing through the bore of the shell. Fluids passing through the bore of the shell are forced between the longitudinal fins

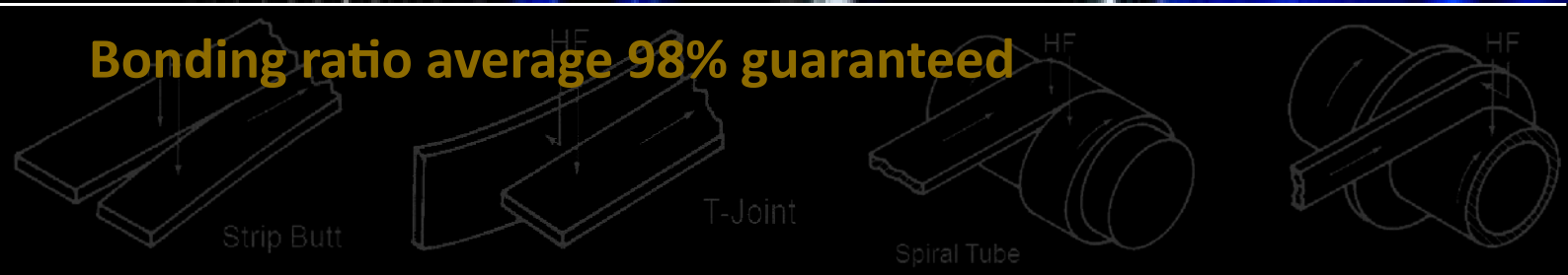
FINNED TUBE

HIGH FREQUENCY WELDED FIN TUBE

Fin material A1008 (others to be discussed)
WPS & PQR submission
Micro scope structure examination



Bonding ratio average 98% guaranteed

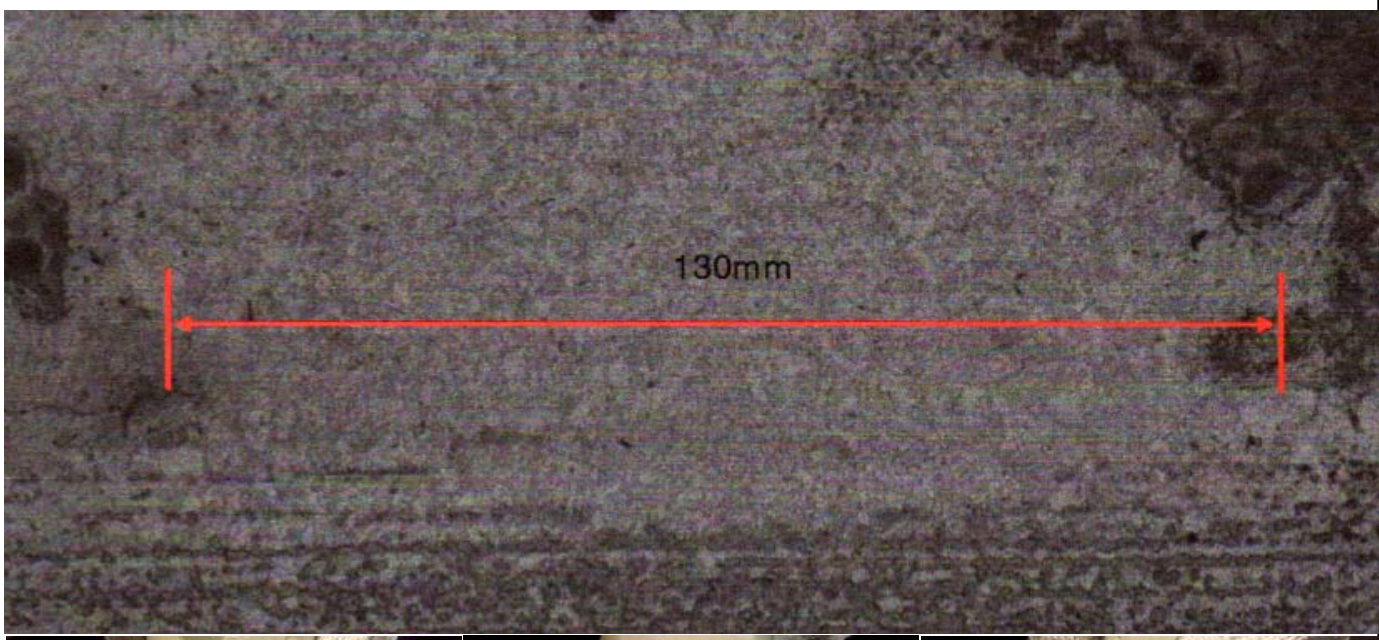


FINNED TUBE

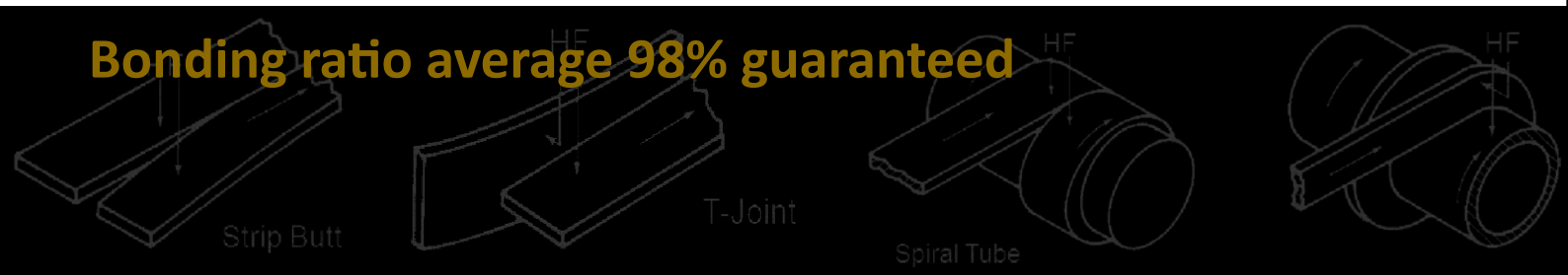
Bonding condition examination
- **Magnification 100 X**

Pulling test

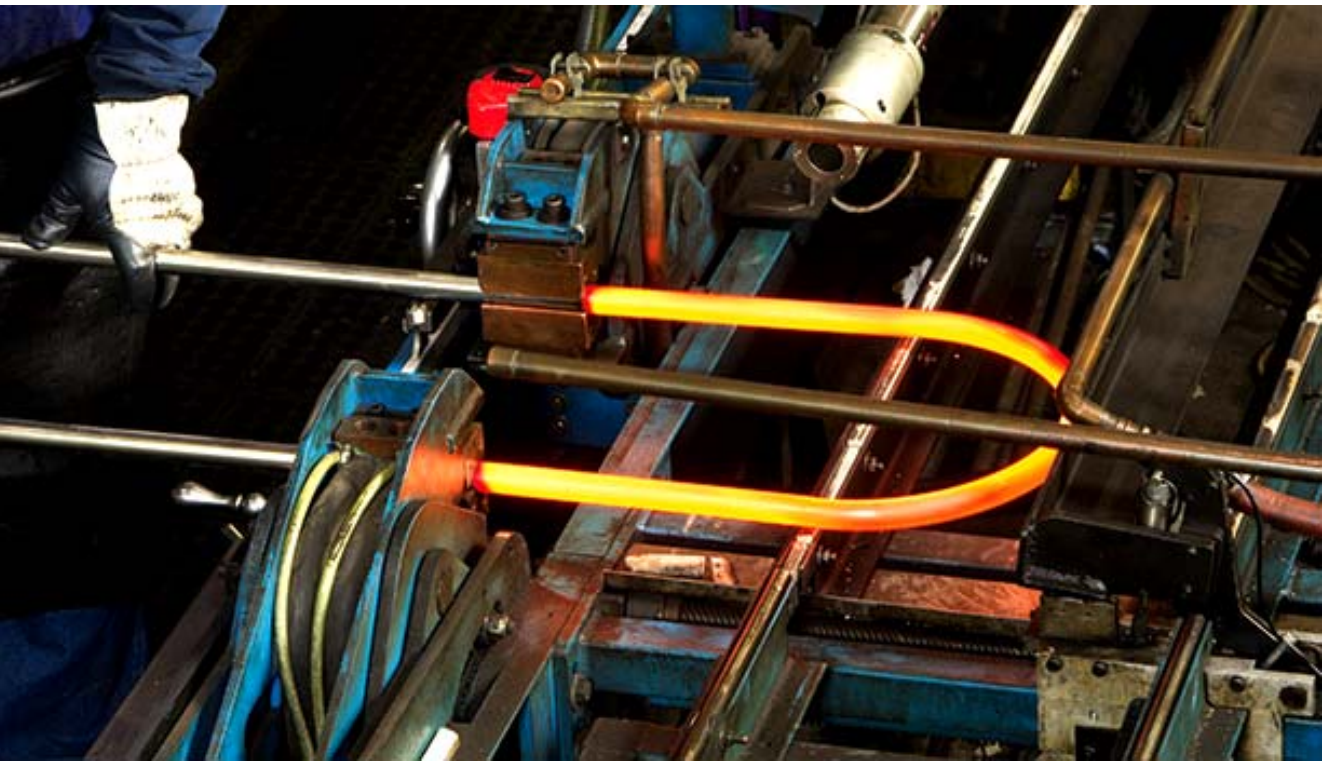
Profile projector test



Bonding ratio average 98% guaranteed



BEND TUBE

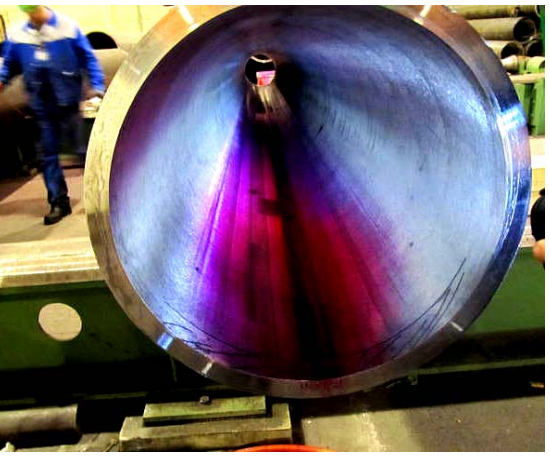


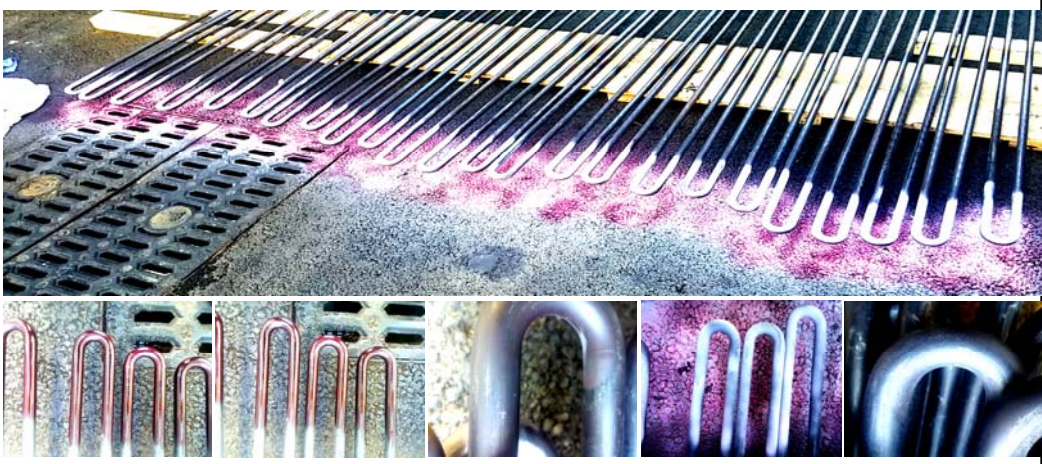
Stress relieving 100% after bending. Annealing, normalizing, tempering depending on material

BEND 15~180˚, Ovality less than 10%

Radius/Diameter 0.5~0.75 ovality 15%, 0.76~1.0 ovality 10%

BEND TUBE





Penetrant testing on bend section
Hydrostatic testing after bending

Hydrostatic test under water pressure 7Mpa average

5 seconds minimum

MT or PT to be performed at bend section

HRSG, BOILER PIPE & TUBE

Membrane pipe & tube, tube bending
Fin material A1008 (others to be discussed)
WPS & PQR submission
Micro scope structure examination
PT, UT, MT on weld area
EN10204 3.2 Third Party Inspection available




Specialized in fabrication of boiler pipe & tube

HRSG, BOILER PIPE & TUBE

Export packing mode, wrapping by plastic bag to prevent from wet

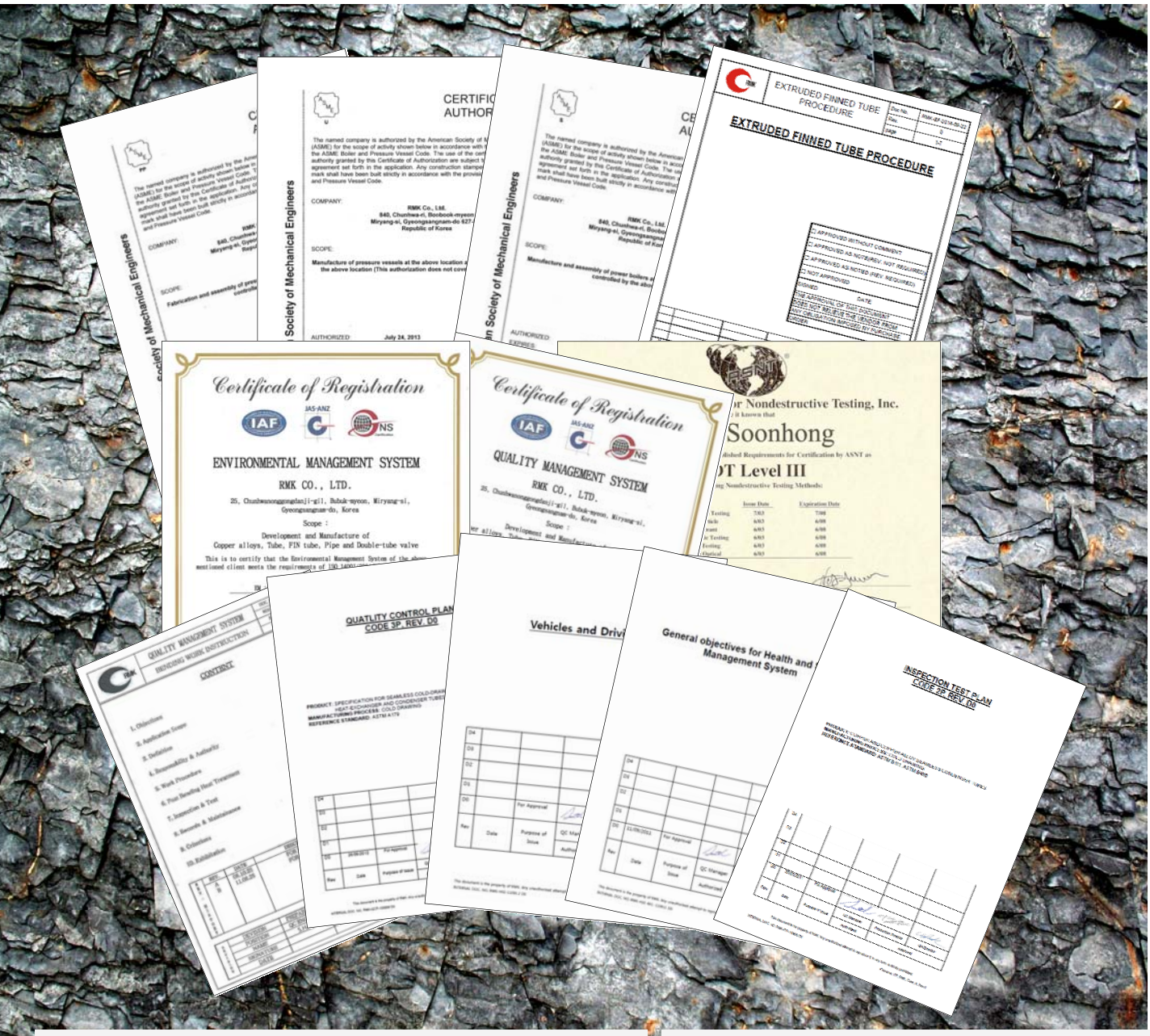
Providing maintenance and installation service

HIGH FREQUENCY BEND PIPE

HIGH FREQUENCY BEND
for 6” and under small size tube and pipe.
Ultrasonic Test, Magnetic Particle Test, Liquid Penetrant Test
Dimensional Check, Mechanical Test
Heat Treatment on bend area plus 150mm

Bending material A53B, A106B, API 5LB, A335 P5, P11, P9, P91

QUALITY ASSURANCE AND APPROVALS



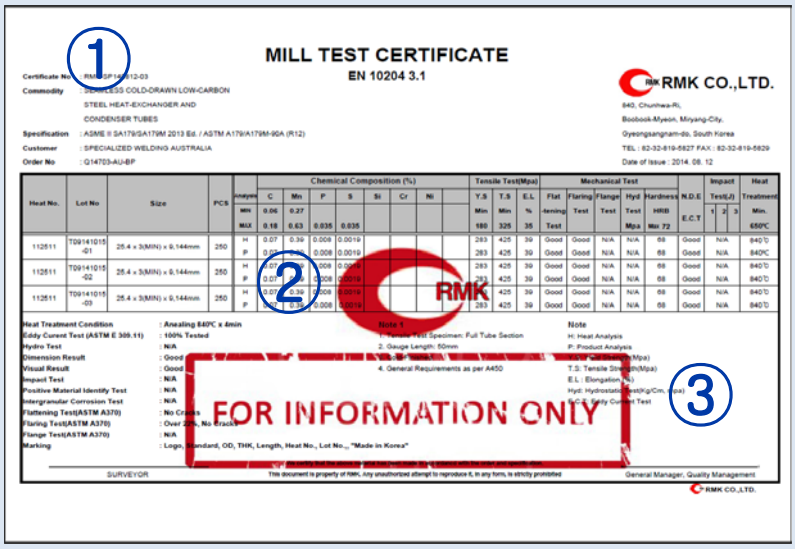
INSPECTION TEST PLAN
QUALITY CONTROL PLAN
BENDING PROCEDURE
FINNING PROCEDURE
VEHICLE AND DRIVNIG PROCEDURE
HSE PROCEDURE

ASME U, S, PP CERTIFICATE
ISO 9001 : 2004
ISO 14001 : 2004
NDE LEVEL III CERTIFICATE

Knowledge of pressure vessel makes quality of tubes perfect and removes obstacles that can happen during assembly at job site. Quality control during production and final inspection before delivery are performed.

QUALITY ASSURANCE AND APPROVALS

Sample MTC

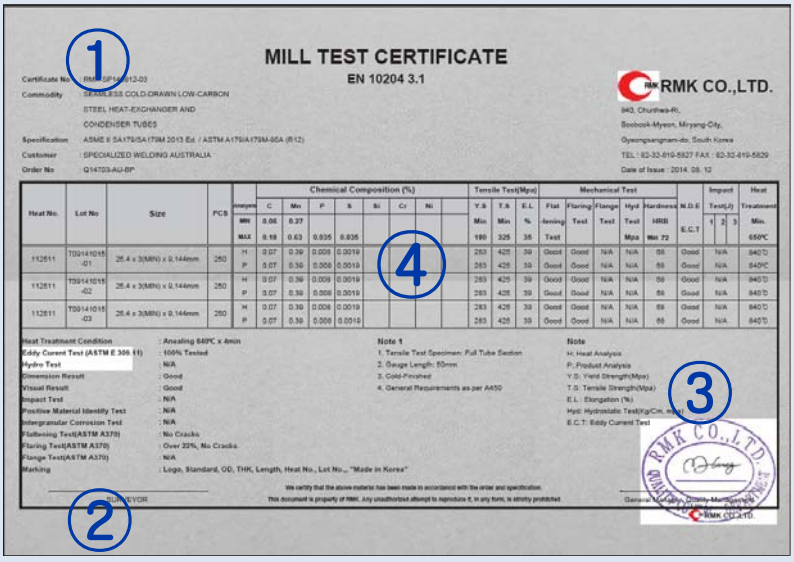


① Regular printing paper

② 'for information only' mark

③ No wet ink stamp and signature

Approved MTC



① Forgery proof paper

② Micro letter

③ Wet ink stamp and signature

④ Company logo

Mill Test Certificate is printed with special forgery proof technology. Document issuing number is traceable at rmk05@raremetal.co.kr or Tel +82-32-819-5827

FACTORY FACILITIES

RMK TUBE

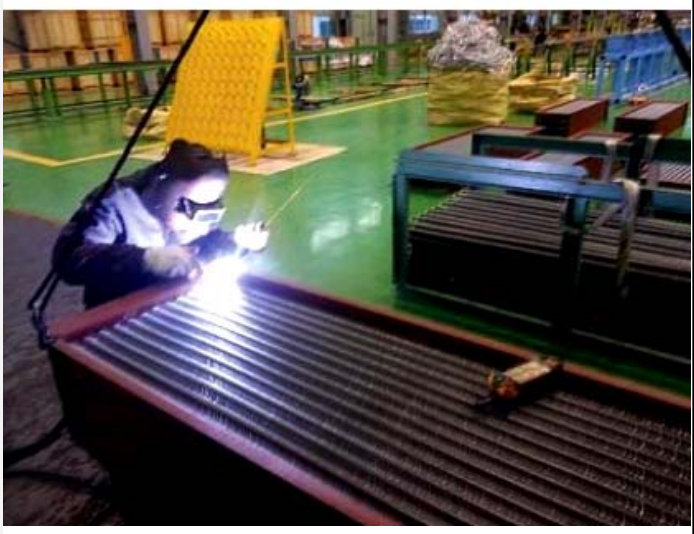
Location Milyang, Korea

Premises
Totally 20,000 square meters
including office building

Equipment
6 cold drawing machines
2 heat treatment furnaces
1 cutting machine
4 pointing machines
2 straightening machines
5 finning machines

Test equipment
universal test machine
chemical composition analyzer
multi hardness tester
electronic micro scope
ECT eddy current testing (rotary type)
profile projector

PT penetrant testing
MT magnetic particle testing
VT visual testing
RT X-ray testing



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APPROVED VENDOR REGISTRATION

PETRONAS MALAYSIA

THAI ROTARY ENGINEERING POBLIC COMPANY LIMITED THAILAND

CARSO OPERADORA MEXICO

RAPSOL PERU

EXCHANGER INDUSTRIES CANADA

HEAT EXCHANGER COMPANY U.S.A.

SERCK SERVICES INTERNATIONAL U.A.E.

RAS GAS QATAR

QATAR GAS QATAR

PIDEMCO IRAN

GARMAGOSTAR IRAN

EGPC EGYPT

ORASCOM EGYPT

ATTOCK REFINERY LIMITED PAKISTAN

PAKISTAN REFINERY LIMITED PAKISTAN

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U.A.E.

UNIT 606 UBORA TOWER DUBAI, U.A.E.

Email rm12@raremetal.co.kr

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Email zulmahmud@redmultiengineering.com

MEXICO

PASEO DEL PEDREGAL 655 COL. JARDINES DEL PEDREGAL. AL VARO OBREGON, MEXICO D.F. MEXICO

Email myongokshin@hotmail.com

Please contact the region manager for inquiry as mentioned above. For other region, please contact head office in Korea.

RMK CO., LTD. CHUNHWA INDUSTRIAL COMPLEX, 840 CHUNHWA-RI, BUBUK-MYEON, MIRYANG-SI, GYEONGNAM, KOREA

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