# Optional / Variation (Custom-made)

# Disassembly-washable type Route Heat Exchanger



(Titanium • Washable)

### **■** stain free & lower pressure loss

This route heat exchanger has a stain free or water scale-free structure with baffle plates which generates an eddy. This leads to a reduced pump load, by minimizing the pressure loss.

### **■** washable → Maintain primary performance

When heat-transfer performance goes down due to the adhesion of waste, the heat transfer tubing can be removed from the shell and cleaned by means of pressure washing. Due to the ability to clean the tubes, the primary heat exchanger performance can be recovered. (\*See table below)

### **■** simple maintenance, Reasonable, risk free

Because of the generally available flange joint structure, disassembling points are few and maintenance is simple. No need to use any specialty tools. With commonly available sheet type gaskets the price remains reasonable. Assembly is easy, and risk free because leakage caused by poor sealing is unlikely.

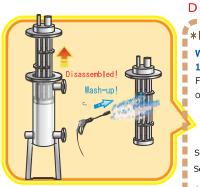
### ■ maintenance as a preventive measure

Not only does washing aid in eliminating corrosion in its early stages, periodic maintenance allows for visual inspection of the heat transfer surface when the tubing is removed and allows for early detection of any possible abnormalities. These are preventive measures against trouble and impact on the operation.

Moreover, tubing repair is greatly simplified.

### ■ large choice in material

As with the conventional Route heat exchanger, SPF can provide the corrosion-resistant material according to the property of plating solution.



### NO<sup>-</sup>

\*Performance drop can be recovered by washing \*

We define the performance of a brand-new model as

100%, and heating time as 60 minutes.

Following data shows performance drop after 2 years of use and performance recovery after washing.

	Performance after 2 years-use	Heating time		After recovery
Water	85%	71min	Wash-up!	63min
Solution A	70%	85min		67min
Solution B	50%	120min		71min
17.7	, ,	,		

### \*The distinction between conventional model.\*

Steam flows through the heat transfer tubing.

 $\diamond$  The plating solution flows between the tubing and shell.

The tubing is round tube, but not F-typeOnly heating type is available.

(As of March 2010)

Please contact SPF sales division for details or any













High efficiency · Compact · Corrosion Resistant heat exchanger

A wide range of corrosion resistant metals are avilable, to accomodate various chemicals.

# ■ The Gold Standard

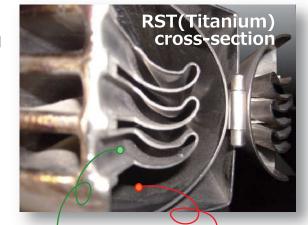
A wide range of corrosion resistant metals are available to accommodate various chemicals. The surface finishing industry standard in heat exchangers of a compact design with a high efficiency.

## **■** Combines compact size with high efficiency

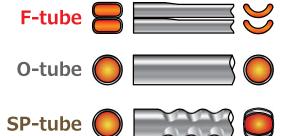
The Route heat exchanger is especially designed for use in plating factory. Semicircular F-tube has double the heat-transfer area as a standard tube (O-tube), but only half of it's volume.

Therefore, the external dimensions are very compact. Also, due to its shape, the wall and the center of **F-tube** is very close, providing a high efficiency.

\*In case of Niobium, shape will be **SP-tube**.



Inside of F-tube: Plating Inside of shell: Steam



### Quick Delivery

Because of standardized designs, quick delivery is possible.

### ■ Semi-custom / Customization

SPF can propose the most appropriate model for both of heating and cooling, depending on the operating conditions.SPF can also accommodate both horizontal as well as vertical orientation. Larger models are available as well.

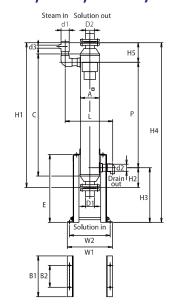
### **■** Wide range of materials.

Wide ranging materials meet various type of chemicals.

304 SS	Zincate bath, Zn Cyanide bath, Alkaline degreasing, etc.
Titanium	Cu Pyrophoshate bath, Cu Sulfate bath, Ni watts bath, Cr sergeant bath, Zn acid bath, etc.
Zirconium	Tin acid plating bath, Sulfate anodizing bath, etc.
Niobium	Cr fluoride bath, Cr etching bath, Ni strike bath, etc.

# RSN(Titanium) (Niobium)

# **■** Specifications (Standard dimensions)



**RSN** 

### RST, RSZ, RSA7/A3 ■RST (Titanium), RSZ (Zirconium)

										3010	ILIOIT		Steam						
Model	A□	С	H1	H2	НЗ	H4	H5	L	Р	D1	D2	d1	d2	d3	W1	W2	B1	B2	Е
1000	100	840	995	135	375	1235	135	292	725	32A	32A	25A	25A→15A	15A	280	250	280	150	465
2000	11	11	11	11	"	H	11	11	11	11	11	H	11	- 11	11	11	"	11	11
3000	"	- 77	11	"	"	11	11	294	11	40A	40A	32A	32A→15A	"	11	11	- 11	11	"
4000	11	- 11	11	"	- 11	11	11	- 11	11	11	11	11	"	- 11	11	11	- 11	11	11
5000	H	11	H	11	11	H	H	- 11	H	H	11	H	#	- 11	H	H	- 11	11	11
6000	- 11	"	11	- 11	"	II .	- 11	- 11	"	11	11	H	"	- 11	"	11	- 11	"	- //
7000	130	"	11	"	"	11	11	327	11	50A	50A	40A	40A→15A	"	310	280	"	11	11
8000	11	11	11	11	"	н	11	11	11	11	11	H	11	- 11	11	11	"	11	11
9000	- 11	11	11	11	"	H	- 11	330	11	11	11	H	40A→20A	- 11	11	11	- 11	11	"
10000	"	11	11	- 11	"	H	11	"	11	11	11	H	H	- 11	11	11	"	11	- 11
12000	175	11	11	11	"	H	11	383	11	11	11	50A	50A→20A	20A	355	325	"	11	11
14000	- 11	"	11	- 11	"	II .	H	390	11	11	11	H	50A→32A	- 11	"	11	- 11	"	- //
16000	11	"	11	"	"	11	11	"	11	11	11	H	"	"	11	11	"	"	11
18000	11	11	H	11	- 11	II	H	- 11	11	H	11	H	#	- 11	11	H	- 11	11	11
20000	11	"	11	11	"	II .	11	"	11	11	11	H	"	- 11	11	11	- 11	"	"
25000	"	"	1030	160	495	1365	160	432	710	65A	65A	65A	65A→32A	25A	11	11	300	200	595
30000	H	11	H	11	11	H	H	- 11	11	H	11	H	#	- 11	11	H	- 11	11	Н
35000	250	"	1050	170	"	1375	170	507	11	11	11	H	H .	- 11	470	430	- 11	11	- 11
40000	11	"	11	"	"	11	11	"	11	11	11	H	"	"	11	11	"	11	11
45000	11	11	н	11	"	н	11	530	11	11	11	80A	80A→40A	32A	11	H	"	11	11
50000	"	"	11	"	"	11	11	"	11	11	11	11	"	"	11	11	"	"	11
60000	280	"	1070	180	"	1385	180	560	11	80A	80A	H	H .	- 11	500	460	350	250	H

<sup>\*</sup>Operating conditions:Steam pressure 0.19MPa

### ■RSA7 (SUS304), RSA3 (SUS316L)

	H1 995	H2	Н3	Н4	H5												-
	995				113	L	P	D1	D2	d1	d2	d3	W1	W2	B1	B2	E
H		135	375	1235	135	298	725	32A	32A	25A	25A→15A	15A	280	250	280	150	465
	11	"	- 11	11	11	- 11	11	11	11	11	"	"	11	11	"	11	"
11	11	"	- 11	11	- 11	300	11	40A	40A	32A	32A→15A	"	"	- 11	"		"
11	11	"	"	11	"	"	"	11	"	н	"	"	"	"		"	"
"	11	"	"	"	"	"	"	"	"	11	"	"	"	"	"	"	"
"	11	"	"	11	"	"	"	"	"	11	"	"	"	"	"	"	"
11	"	"	"	"	"	303	11	50A	50A	40A	40A→15A	"	"	"	"	"	"
11	H	"	"	11	11	"	"	H	"	Н	"	"	"	11	"	"	"
11	11	11	- 11		- 11	330	11	11	11	11	40A→20A	"	310	280	"	"	"
11	п	11	- 11	H	- 11	- 11	11	H	11	H	"	"	11	- 11	- 11	11	11
11	11	"	"	11	- 11	338	11	11	11	50A	50A→20A	20A	11	11	"	11	"
11	11	11	"	11	- 11	345	11	H	11	H	50A→32A	"	11		"	11	11
11	11	11	- 11	11	11	390	11	11	"	11	"	"	355	325	"	"	11
11	11	11	- 11	11	- 11	- 11	11	11	"	11	"	"	11	11	"	11	11
11	11	H	- 11	11	- 11	- 11	11	H	11	H	"	- 11	11	H	- 11	11	11
103	1030	160	495	1365	160	432	710	65A	65A	65A	65A→32A	25A	"	- 11	300	200	595
11	"	"	- 11	"	"	- 11	"	"	"	11	"	"	"	"	"	"	"
105	1050	170	"	1375	170	507	11	"	"	"	"	"	470	430	"	"	"
11	11	11	- 11	11	- 11	- 11	11	11	11	11	"	"	11	11	- 11	11	11
11		"	- 11	11	- 11	530	11	11	"	80A	80A→40A	32A	11	11	"	"	"
11	11	"	- 11	11	- 11	- 11	"	11	11	11	"	"	"	- 11	"	"	"
107	1070	180	- 11	1385	180	560	11	80A	80A	11	"	"	500	460	350	250	11
		" " 1070	" " " " " " 1070 180	" " " " " " " " 1070 180 "	n         n         n         n           n         n         n         n           n         n         n         n           1070         180         n         1385	n         n         n         n           n         n         n         n           n         n         n         n           n         n         n         n           1070         180         n         1385         180	n         n         n         n         n           n         n         n         n         530           n         n         n         n         n           1070         180         n         1385         180         560	n         n         n         n         n         n           n         n         n         n         n         n           n         n         n         n         n         n           n         n         n         n         n         n           n         n         1385         180         560         n	n         n         n         n         n         n         n           n         n         n         n         n         530         n         n           n         n         n         n         n         n         n         n         n           1070         180         n         1385         180         560         n         80A	n         n         n         n         n         n         n         n         n           n         n         n         n         n         530         n         n         n           n         n         n         n         n         n         n         n         n           1070         180         n         1385         180         560         n         80A         80A	n         u         n         n         n         u         u         n         n         n           n         n         n         n         530         n         n         n         80A           n         n         n         n         n         n         n         n         n           1070         180         n         1385         180         560         n         80A         80A         n	n         n	n         u         n         n         n         u         u         n         n         n         u         u         n         n         n         n         u         n	n         n	n         n	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	n         n

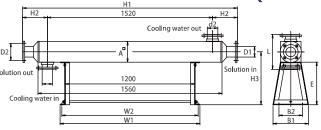
<sup>\*</sup>Operating conditions:Steam pressure 0.19MPa

### ■RSN (Niobium)

											Soli	ution		Steam						
Mo	odel	φΑ	С	H1	H2	Н3	H4	H5	L	Р	D1	D2	d1	d2	d3	W1	W2	B1	B2	Е
10	000	140	495	575	135	367	807	135	322	305	32A	32A	25A	25A→15A	15A	330	295	250	150	350
20	000	11	"	11	11	"	11	11	"	"	"	"	11	"	11	11	"	11	"	"
30	000	11	"	11	11	371	811	"	"	"	40A	40A	32A	32A→15A	H	"	"	11	"	11
40	000	11	"	11	11	"	- 11	11	"	"	н	"	- 11	11	11	11	"	11	"	11
50	000	190	"	11	11	"	- 11	"	360	"	н	"	11	11	11	345	310	11	"	"
60	000	140	915	995	11	"	1231	"	322	725	"	"	"	"	"	330	295	"	"	"
80	000	11	"	11	11	375	1235	"	328	"	50A	50A	40A	40A→15A	11	"	"	11	"	"
10	0000	190	"	- 11	11	"	"	"	362	"	"	"	"	40A→20A	11	360	325	"	"	"
12	2000	11	"	11	11	380	1240	"	370	"	"	"	50A	50A→20A	20A	11	- 11	11	"	11
14	1000	11	"	11	н	"	"	"	377	"	"	"	"	50A→32A	11	"	"	н	"	"
16	000	11	"	"	11	"	"	"	"	"	11	"	"	"	"	"	"	11	"	"
18	3000	220	"	"	11	"	"	"	420	"	11	"	"	"	"	390	355	11	"	"
20	0000	11	"	11	H	"	"	"	"	"	"	"	"	"	"	"	- 11	11	"	"

<sup>\*</sup>Operating conditions:Steam pressure 0.19MPa

### C (Cooling horizontal type) ■ C (Titanium, Zirconium, SUS304/316L)



						in	out	in	out					
Model	Α□	H1	H2	Н3	L	D1	D2	d1	d2	W1	W2	B1	B2	Е
C-10000	100	1890	185	380	220	40A	40A	40A	40A	1280	1250	250	150	330
C-14000	"	"	"	"	"	50A	50A	50A	50A	"	"	"	"	"
C-16000	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-18000	130	1900	190	395	250	"	"	"	"	"	"	"	"	"
C-20000	"	"	"	"	"	65A	65A	65A	65A	"	"	"	"	"
C-25000	"	11	"	"	"	"	11	"	"	"	"	"	"	"
C-30000	"	"	"	"	"	"	"	"	"	"	"	"	"	"
C-36000	175	11	"	448	295	"	11	"	"	11	11	300	200	360
C-40000	11	11	"	"	"	"	"	"	"	"	11	"	"	"
C-50000	"	1940	210	"	"	80A	80A	80A	80A	"	11	"	"	"
C-60000	"	"	"	"	"	"	"	"	"	"	"	"	"	11