

**GRAPHILOR SIC®**

# SILICON CARBIDE POLYTUBE HEAT EXCHANGERS

[www.serviceprocess.net](http://www.serviceprocess.net)

**Service Process Equipment, Inc.**

*Mike Sellers  
Sales Representative*

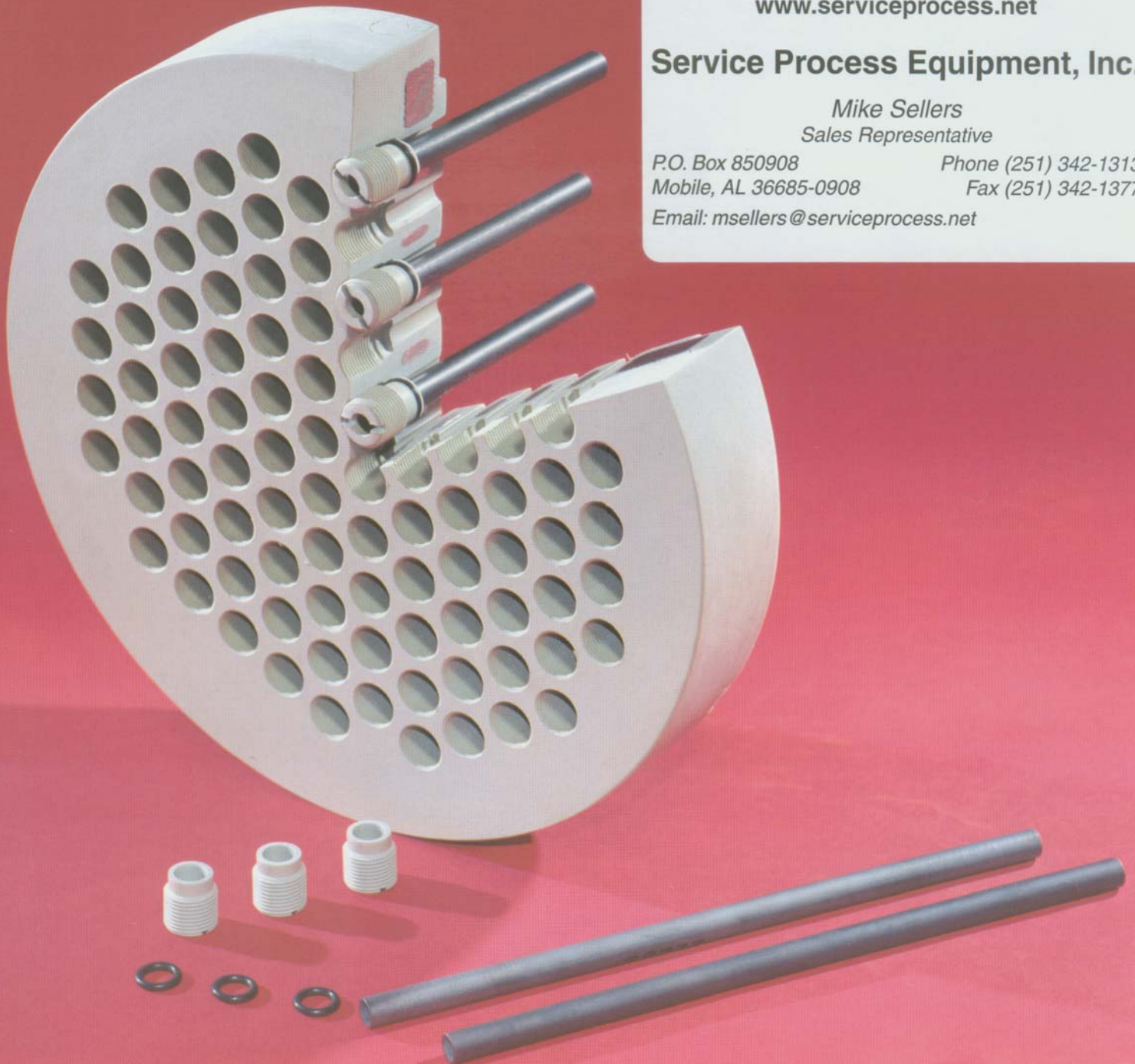
P.O. Box 850908

Phone (251) 342-1313

Mobile, AL 36685-0908

Fax (251) 342-1377

Email: [msellers@serviceprocess.net](mailto:msellers@serviceprocess.net)



**CARBONE OF AMERICA**

 **GROUPE  
CARBONE LORRAINE**

# SILICON CARBIDE

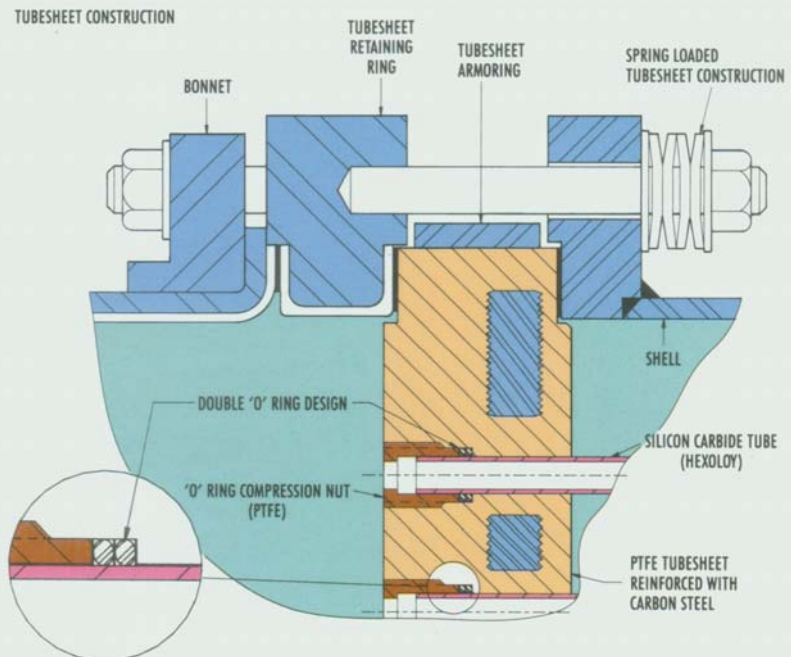
An advanced ceramic material which offers the following advantages:

1. Chemical resistance to strong acids, bases, oxidants and chlorinated organics.
2. Completely impervious without the use of any impregnants.
3. Non-contaminating for high purity applications.
4. Excellent thermal conductivity resulting in efficient heat transfer and immunity to thermal shock.
5. Excellent mechanical properties.
6. High erosion resistance allowing higher velocity and improved heat transfer.

AND . . .

7. A cost-effective alternative to exotic metals and plastics.

Carbone of America, worldwide supplier of GRAPHILOR® impervious graphite products for the chemical industry, has now extended its products to include silicon carbide shell and tube heat exchangers.



## DESIGN OPTIONS:

The Carbone of America Silicone Carbide Heat Exchanger is offered with several design options for your specific application requirements.

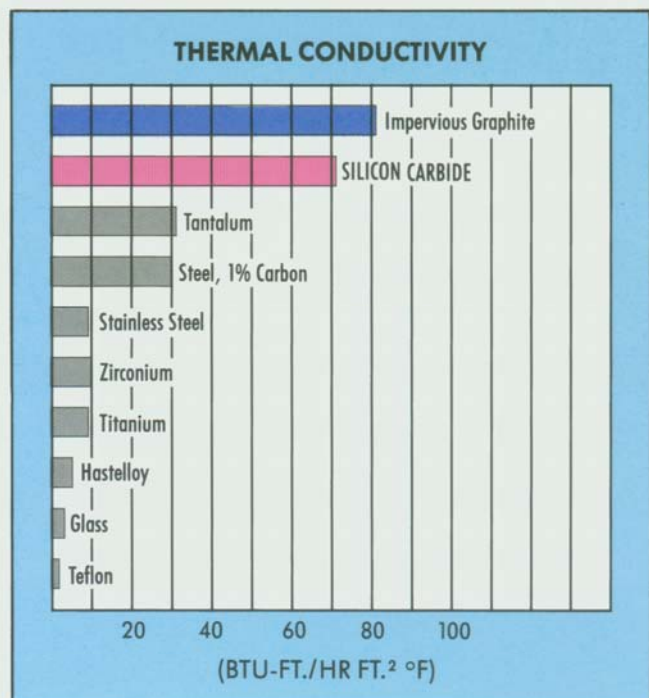
- Double "O" ring design (see illustration).
- Single "O" ring design (see illustration).
- Single fixed tubesheet design (see illustration).
- Double tubesheet design.
- Materials of construction.
- Multi-pass process flow.
- 1/2" Ø tubes, 15' long are available.
- 14mm O.D. tubes available to replace glass tubes

## CONSTRUCTION:

The Hexoloy® silicon carbide tubes are matched with Teflon® tubesheets for a combination of corrosion resistance and thermal performance that cannot be equaled by other materials in severe chemical applications.

## MAINTENANCE:

The construction of the Carbone Silicon Carbide Heat Exchanger allows for all maintenance and repairs to be performed "in-house" by your maintenance personnel for less down time and lower cost.



GRAPHILOR SIC, GRAPHILOR & POLYTUBE are registered trademarks of Carbone Lorraine.  
Teflon is a registered trademark of DuPont.  
Hexoloy is a registered trademark of Carborundum.

CARBONE OF AMERICA/CHEMICAL EQUIPMENT DIVISION



# DESIGN INFORMATION

## SINGLE PASS\*

SHELL SIZE	TUBE COUNT	HEAT TRANSFER AREA IN SQ. FT. FOR 1/2" OUTSIDE DIAMETER TUBES							
		TUBE LENGTH							
		3'	4.5'	6'	9'	10'	11'	12'	14'
6"	22	8	12	16	25	28	31	34	39
8"	42	14	22	31	48	53	59	64	75
10"	64	22	34	47	72	81	89	98	114
12"	96	32	51	70	109	121	134	146	171
14"	121	40	64	88	137	153	169	184	216
16"	163	54	86	118	183	205	226	247	290
18"	212	69	111	153	239	266	294	321	377
20"	268	88	140	193	300	335	370	405	475
22"	332	111	174	241	372	415	459	502	589
24"	397	133	208	289	444	496	548	600	704
26"	475	156	246	343	529	591	654	715	840
28"	559	184	289	403	623	696	769	842	989
30"	649	210	332	465	720	804	889	974	1144

SHELL SIZE	TUBE COUNT	HEAT TRANSFER AREA IN SQ. FT. FOR 3/4" OUTSIDE DIAMETER TUBES							
		TUBE LENGTH							
		3'	4.5'	6'	9'	10'	11'	12'	14'
6"	10	5	8	11	17	19	21	23	27
8"	22	11	18	24	37	41	46	50	59
10"	37	19	30	41	62	70	77	84	99
12"	55	28	44	60	93	103	114	125	147
14"	64	32	51	70	107	120	132	145	170
16"	88	44	70	96	147	165	182	199	234
18"	110	54	86	119	184	205	227	248	292
20"	151	74	119	163	252	282	311	341	400
22"	178	87	140	192	297	332	367	402	472
24"	212	102	165	227	352	394	435	477	560
26"	254	123	197	272	421	472	522	571	671
28"	301	143	231	320	497	557	615	674	793
30"	349	166	268	371	576	645	714	782	919

**HEXOLOY, ALPHA SILICON CARBIDE, IS ONE OF THE HARDEST HIGH PERFORMANCE MATERIALS AVAILABLE FOR HEAT EXCHANGER TUBES. THE DENSITY IS IN EXCESS OF 98% OF THEORETICAL AND IS COMPLETELY IMPERVIOUS WITHOUT THE NEED FOR RESIN IMPREGNATION. BECAUSE OF HEXOLOY'S HIGH THERMAL CONDUCTIVITY, A CARBONE SIC POLYTUBE EXCHANGER MAY REQUIRE LESS HEAT TRANSFER AREA WHEN COMPARED WITH OTHER CORROSION RESISTANT HEAT TRANSFER MATERIALS.**

\*MULTIPASS PROCESS UNITS USE FEWER TUBES TO ACCOMMODATE THE PASS RIBS.



# SILICON CARBIDE POLYTUBE DATA

CARBONE OF AMERICA

**GROUPE**  
**CARBONE LORRAINE**

HEAT EXCHANGER WEIGHTS (DRY)								
SHELL SIZE	TUBE LENGTH							
	3'	4.5'	6'	9'	10'	11'	12'	14'
6"	325	365	400	475	500	525	550	600
8"	500	540	575	650	675	700	725	775
10"	625	700	775	925	975	1025	1075	1125
12"	775	890	1000	1225	1300	1375	1450	1600
14"	925	1035	1150	1375	1450	1525	1600	1750
16"	1175	1290	1400	1625	1700	1775	1850	2000
18"	1350	1500	1650	1950	2050	2150	2250	2450
20"	1525	1715	1900	2275	2400	2525	2650	2900
22"	1825	2015	2200	2325	2450	2575	2700	2950
24"	2050	2275	2500	2950	3100	3250	3400	3700
26"	2300	2600	2900	3500	3700	3900	4100	4500
28"	2700	3000	3300	3900	4100	4300	4500	4900
30"	3100	3400	3700	4300	4500	4700	4900	5300

PHYSICAL PROPERTIES OF HEXOLOY TUBES (@ Room Temperature)	
Thermal Conductivity	871.2 BTU / (hr ft <sup>2</sup> °F)/in
Wall Resistance (0.06 in. tubing)	0.000069 (hr ft <sup>2</sup> °F)/BTU
Coefficient of Thermal Expansion	2.2 × 10 <sup>-4</sup> in/(in °F)
Modulus of Elasticity	59.0 × 10 <sup>6</sup> (LB/in <sup>2</sup> )
Poisson Ratio	0.14
Density	0.112 (LB/in <sup>3</sup> )
Flexural Strength	67.0 × 10 <sup>3</sup> (LB/in <sup>2</sup> )
Compressive Strength	560.0 × 10 <sup>3</sup> (LB/in <sup>2</sup> )
Knoop Hardness	3.98 × 10 <sup>6</sup> (LB/in <sup>2</sup> )
Permeability	Totally Impervious
Erosion/Abrasion	50% harder than Tungsten Carbide
Thermal Shock	Able to withstand over 500°F ΔT

TYPICAL CORROSION-RESISTANCE		
Corrosive Medium	Temperature °F (°C)	Hexoloy Corrosion Rate (MPY)
98% H <sub>2</sub> SO <sub>4</sub>	212 (100)	0.23
85% H <sub>3</sub> PO <sub>4</sub>	212 (100)	<0.03
53% HF	77 (25)	<0.03
50% NaOH	212 (100)	0.32
45% KOH	212 (100)	<0.03
70% HNO <sub>3</sub>	201 (94)	0.13
37% HCl	187 (86)	0.11



The information, recommendations, and opinions set forth herein are offered solely for your consideration, inquiry and verification and are not, in part or total, to be construed as constituting a warranty or representation for which we assume legal responsibility. Nothing contained herein is to be interpreted as authorization to practice a patented invention without a license.

CARBONE OF AMERICA CORP.  
Chemical Equipment Division  
540 Branch Drive  
SALEM, VA 24153

Tel.: (540) 389-7535  
Fax: (540) 389-7538

CARBONO LORENA DE MEXICO, S.A.  
San Sebastian #110, Col. Los Lermas  
GUADALUPE, NUEVO LEON, MEXICO 67190

Tel.: (52) 83-609876  
Fax: (52) 83-609875

CARBONE OF AMERICA (LCL) LTD.  
225 Harwood Boulevard  
DORION, QUEBEC, CANADA J7V 1Y3

Tel.: (514) 455-5728  
Fax: (514) 455-5052

BULLETIN SIC

3M98

Printed in U.S.A.