ACTIVE CHEMICAL SYSTEMS

IMPREG-TITE
GRAPHITE
HEAT EXCHANGERS

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Standard shell and tube exchangers resistant to chemical attack from acids, alkalies, solvents and salts.

IMPREG-TITE ... as a material of construction combines graphite, one of the most chemically inert materials, unequaled in heat transfer characteristics, with a series of resins to give the engineer a new dimension in heat transfer design in this energy and environment conscious world.

Corrosion Resistance Characteristics

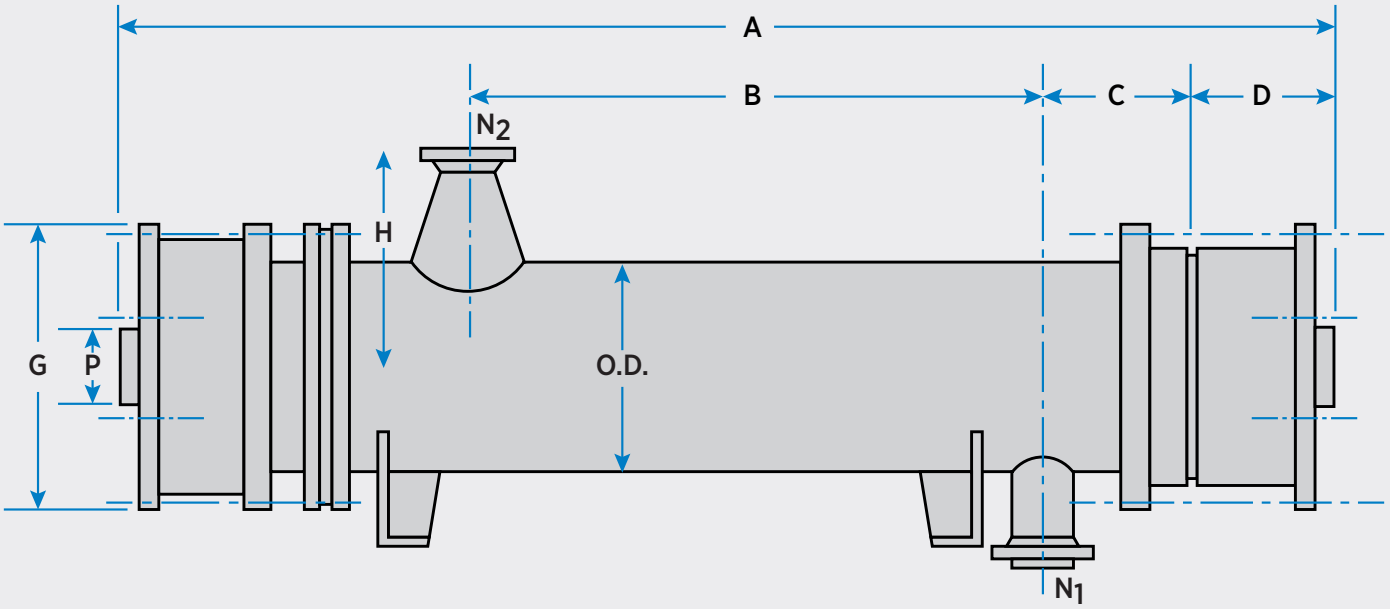
IMPREG-TITE is virtually immune to thermal shocks and can typically handle difficult solutions such as hydrochloric, sulfuric and hydrofluoric acids, halogenated organics and aqueous salt solutions. ACS has accumulated considerable corrosion data on IMPREG-TITE and can provide to you the benefit of our extensive practical experience in handling difficult solutions. As a matter of policy, ACS may furnish suitable test coupons or a complete test unit for some applications involving combinations of difficult chemicals or proprietary intermediates.

Thermal Characteristics

IMPREG-TITE impervious graphite is immune to thermal shock within its operating limits (340°F) and has a thermal conductivity of 1020 BTU/HR Sq. Ft. (°F/in.), 9 times stainless steel, 6 times Monel, 3 times tantalum and 2.2 times carbon steel! The maximum recommended operating temperature for IMPREG-TITE is 340°F.

Design Characteristics

Because of superior corrosion resistance, Impreg-tite does not require a “corrosion allowance.” Corrosive fluids are normally handled inside IMPREG-TITE tubes for easy cleaning. The corrosive fluid comes in contact with only IMPREG-TITE tubes, tube sheets and domes. Suitable gaskets are furnished on application. Shells are usually furnished in carbon steel for heating with steam or cooling with process water. However, they can be furnished in Haveg, FRP, rubber lined steel or stainless for handling two corrosives simultaneously.



Tube Length (Ft.)	Dim. (in.)	Shell Diameter													
		6	8	10	14	16	18	20	22	24	26	28	30	34	38
6	A	86¼	88¼	89¼	95½	96½	97¾	99½	100¼	103	107½	114	115½	124¼	127
	B	61	55	55	57	57	57	57	53	53	52	51	51	50	47
9	A	122¼	124¼	125¼	131½	132½	133¾	135½	136¼	139	143½	150	151½	160¼	163
	B	97	91	91	93	93	93	93	89	89	88	87	87	86	83
12	A	158¼	160¼	161¼	167½	168½	169¾	171½	172¼	175	179½	186	187½	196¼	198
	B	133	127	127	129	129	129	129	125	125	124	123	123	122	119
14	A	182¼	184¼	185¼	191½	192½	193¾	195½	196¼	199	203½	210	211½	220¼	223
	B	157	151	151	153	153	153	153	149	149	148	147	147	146	142
16	A	206¼	208¼	209¼	215½	216½	217¾	219½	220¼	223	227½	233	235½	244¼	247
	B	181	175	175	177	177	177	177	173	173	172	171	171	170	167
18	A	230¼	232¼	233¼	239½	240½	241¾	243½	244¼	247	251½	258	259½	268½	271
	B	205	199	199	201	201	201	201	197	197	196	195	195	194	191
20	A	254¼	256¼	257¼	263½	264½	265¾	267½	268¼	271	275½	282	283½	292¼	295
	B	229	223	223	225	225	225	225	221	221	220	219	219	218	215
ALL TUBE LENGTHS	C	6½	8¾	7½	10¼	10½	11	11½	12¼	13¾	14¼	16¼	16½	17	20¼
	D	4⅜	5¼	5¾	8¾	8	8½	9⅛	9⅜	10⅝	23¼	29¼	30½	38¼	40¼
	N1	21 P.S.	3	4	4	4	4	4	6	6	6	8	8	8	10
	N2	21 P.S.	3	4	4	4	4	4	6×8	6×8	6×8	8	8	8×10	10
	H	4 13/16	8	9¼	11	12	13	14	15	16	17	20	21	23	25
	Pmax.	3	4	6	6	8	8	10	10	12	12	16	16	20	20
	G	11	13½	16	18	20	22	24	26	28	30	32	34	36	42
	O.D.	6⅝	8⅝	10¾	14	16	18	20	22	24	26	28	30	34	38

Mechanical Characteristics

IMPREG-TITE is immune to plastic deformation, will not cold flow, creep, swell or set. Impregtite is inert, will not flake or rub off and contaminate practically all chemical solutions. IMPREG-TITE is not subject to change age or exposure to cycles of temperature and pressures.

Operating Limits

IMPREG-TITE heat exchangers can be designed for 50 or 75 psig or full vacuum on both tube and shell sides. Maximum operating temperature is 340°F. Maximum recommended steam pressure is 50 psig.

Properties

Mechanical	
Density (lbs. Cu. Ft.)	109
Effective Porosity(%)	None
Tensile Strength (psi)	2600
Compressive Strength	8900
Transverse Strength	4650
Modulus of Elasticity	23

Thermal	
Temperature Resistance °F	340
Thermal Expansion (in. in F × 107)	25.4
Thermal Conducitivity BTU/hr./sq./ft./(F/in.)	1020

Testing

Each individual IMPREG-TITE component is air tested before assembly. Upon completion, the unit is hydrostatically tested at 1½ times the working pressure.

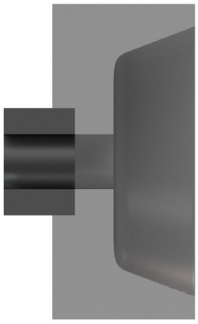
Outside Heat Transfer Area (Sq. Ft.)

Floating Tube Sheet Design

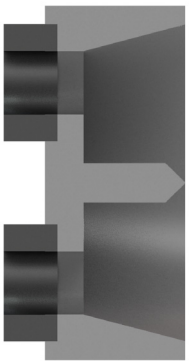
Nominal Shell Dia. In.	No. Tubes	Tube Length Ft.						
		6	9	12	14	16	18	20
6	9	17.7	26.5	35.3	41 .2	47	53	59
8	19	37.2	55.8	74.5	87	99.4	112	124.5
10	31	60.9	91.2	122	142	162	182.4	203
14	42	82	123	164	192	220	247	275
16	64	125	188	250	293	335	377	418
18	85	166	250	334	389	445	500	556
20	109	214	320	427	499	571	642	713
22	130	255	382	510	595	681	766	850
24	163	320	478	640	746	854	960	1066
26	199	390	585	780	910	1040	1175	1300
28	230	452	678	904	1055	1205	1355	1505
30	268	525	790	1050	1230	1400	1580	1755
34	349	685	1025	1370	1600	1830	2055	2283
38	439	860	1290	1720	2010	2300	2585	3875

Domes

Domes are normally furnished in Impreg-tite impervious graphite. Steel or RFP armoring can be furnished to protect the IMPREG-TITE from mechanical abuse or to conform to specific codes. Single pass or multipass construction is furnished to meet your requirements. Nozzles adhere to ANSI 150# flange standards. Nozzles can be furnished either as axial, radial or in combination for liquid-vapor separation.

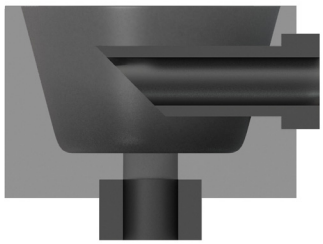


Single Pass Dome Axial Nozzle



Multi-Pass Dome Axial Nozzles

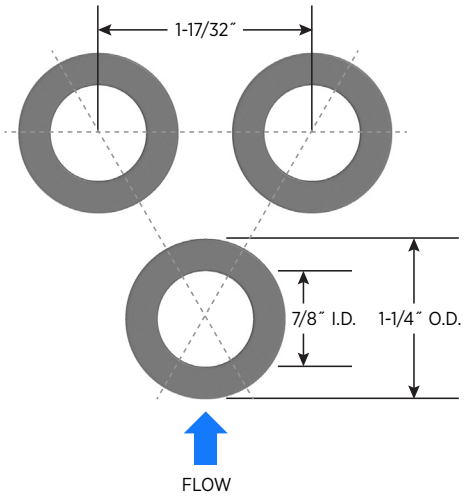
Single Pass Dome Radial Nozzle



Single Pass Dome Liquid-Vapor Separator

Tube Size and Pitch

Standard tube size 7/8″ ID × 1-1/4″ OD on 60° triangular pitch. Standard tube pitch is 1-17/32″. Larger tube pitch is available for easy mechanical cleaning or to reduce pressure drop across tube bundle.



Shell Side Baffles

Baffles are normally furnished in corrosion resistant FRP, which will not corrode to produce sharp knife edges that can damage graphite tubes. Stainless steel, coated steel or alloy can also be furnished.

ACS maintains a qualified staff of engineers to aid in the sizing and selection of the IMPREG-TITE exchanger to meet your requirements. We welcome your inquiry and will be pleased to lend our experience to solve your production needs.

ADDITIONAL ACS PRODUCTS

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