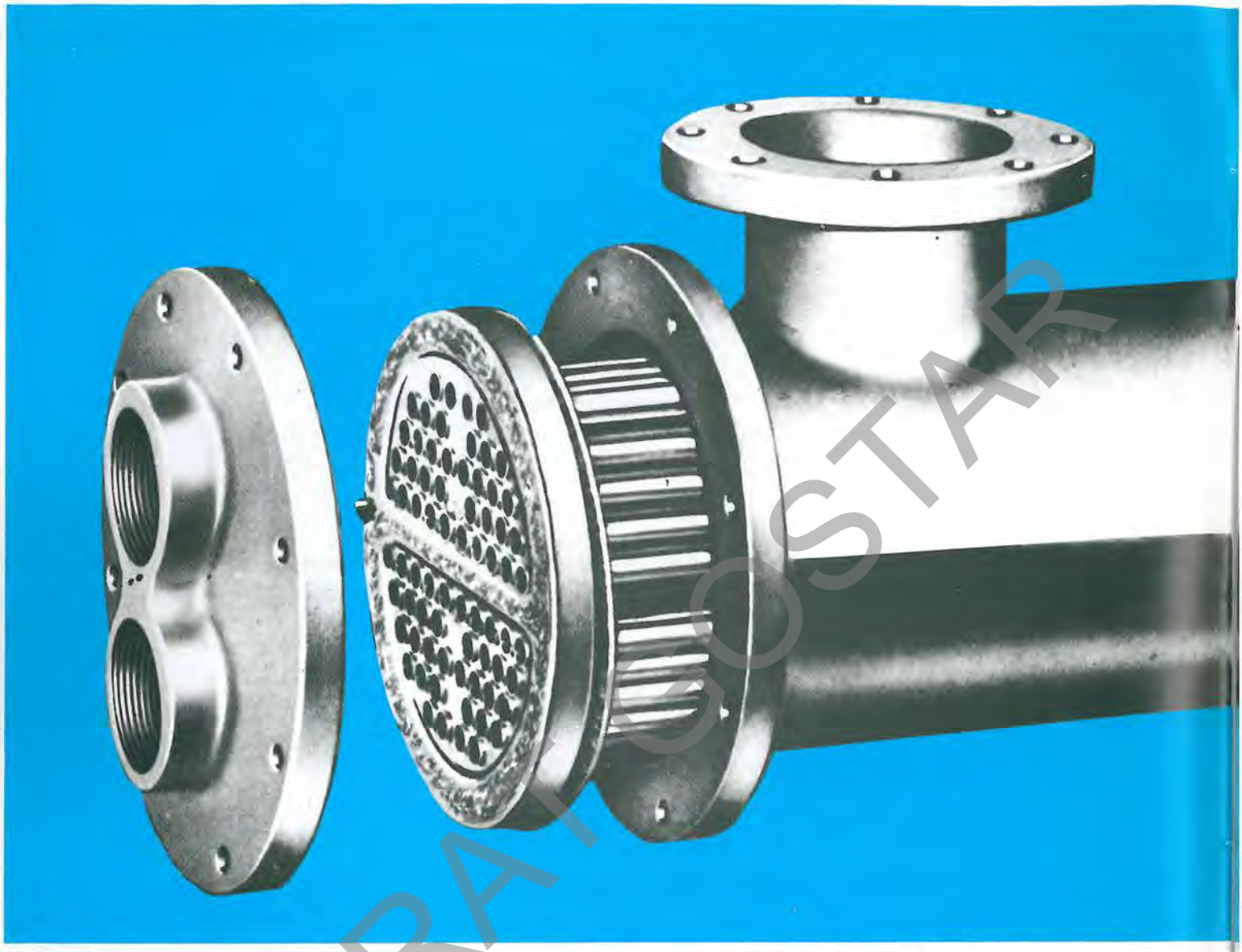
حرارت گستر
HARARAT GOSTAR
QUALITY THROUGH DESIGN & WORKMANSHIP
GOSTAR STEAM & WATER TREATMENT

HEAT EXCHANGER

MODEL: SU

NO.86, TALEGHANI AVE., TEHRAN, IRAN
P.O.BOX:15875-5371
TEL :(021)77 60 58 89,77 60 58 93
FAX :(021)77 60 45 31
EMAIL :INFO@HARARAT-GOSTAR.COM
HTTP://WWW.HARARAT-GOSTAR.COM



HG. Type "SU" Heat Exchangers

GENERAL INFORMATION

The "SU" Heat Exchanger is an instantaneous type, designed to heat liquids with steam. Although the "SU" is used for heating many kinds of liquids, its widest application is for heating water. This catalog lists ratings for most commonly required temperature rises through a wide range of steam pressures. The ratings are based on steam in the shell and the liquid to be heated flowing through the tubes.

These units can be connected to any steam boiler or system. The capacity of the boiler should be checked to be sure that it is sufficient to handle the load imposed by the "SU." Some method of controlling steam flow to the exchanger should be provided and installed according to manufacturers directions.

"SU" Heat Exchangers are available in 2, 4 or 6 pass construction and are catalogued for lengths up to 10 feet and shell diameters through 30 inches. They may be obtained, on special order, in lengths greater than 10 feet. They can also be manufactured of materials other than those listed.

SELECTION PROCEDURE

For heating water with steam, the following conditions must be known.

a. Water flow in tubes, G.P.M. — (Gals. per minute).
b. Water temperature in and out, °F.
c. Steam at the unit, P.S.I.

Step #1—From Table A, determine the clean tube TEMPERATURE FACTOR using water temperature in, out and steam pressure. Interpolate between columns when necessary.

Step #2—Add appropriate fouling allowance to clean tube TEMPERATURE FACTOR from Chart 2 on page 7, recommended fouling allowances are shown. Chart 2 shows the percentage increase that is equivalent to each fouling factor. Note that the percent of fouling allowance is also determined by tube velocity. Selection tables show water velocity for the various flow rates.

Step #3—In the "SU" Capacity Tables, move down the required G.P.M. column and select the unit having a TEMPERATURE FACTOR equal to or greater than the required value from Step #2 above.

Example:

Select an Instantaneous Heater
Rqd.—25 G.P.M.
Water Temp. in—40°F.
Water Temp. out—140°F.
Steam Pressure—20 P.S.I.G.
Fouling—.0005

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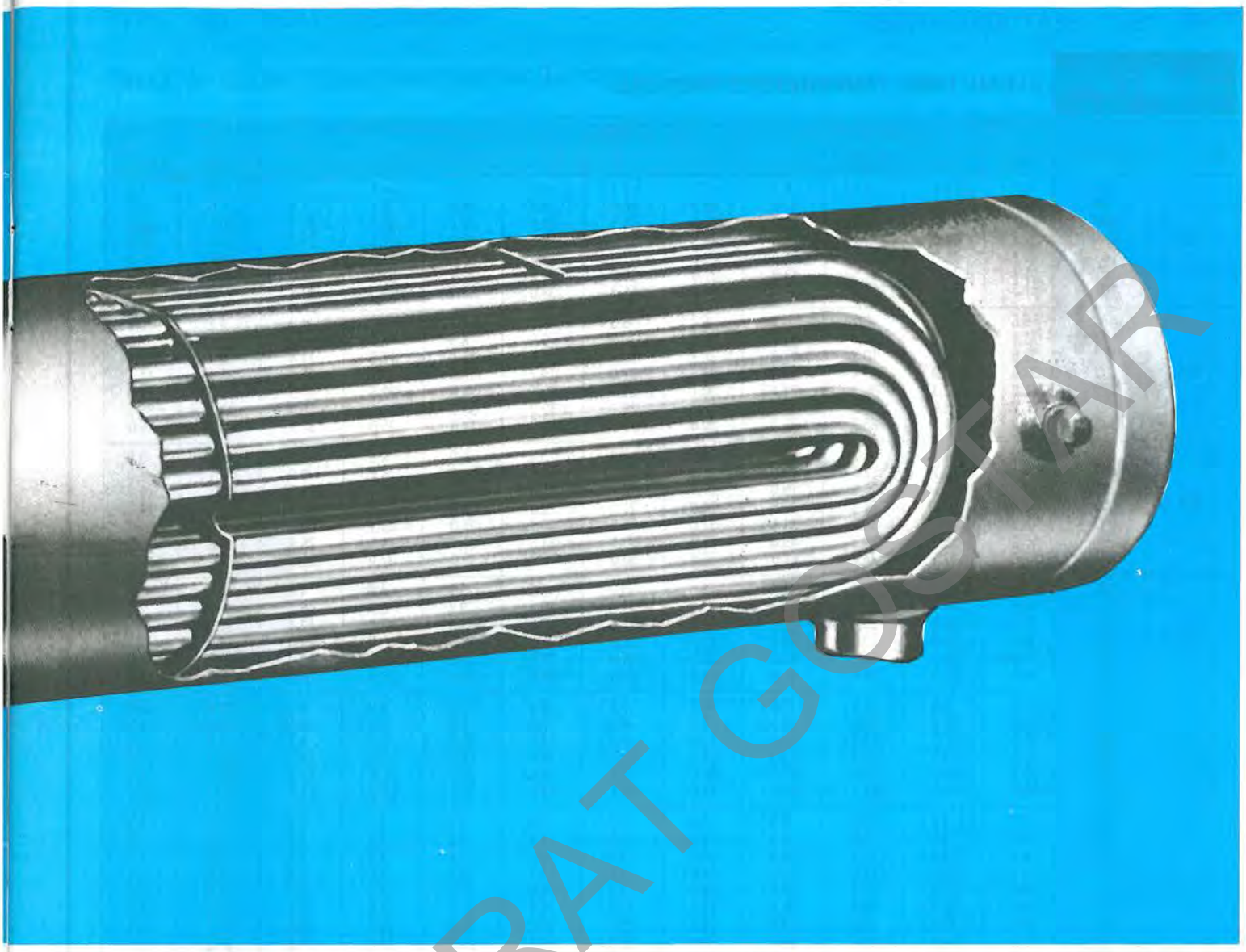

Temperature factor from table A, page 4 is 27.5. From 25 gpm. column in a 6" diameter four pass unit, tentatively select a SU63-4. Since the tube velocity is 3.7 fps. and the required fouling is .0005, turn to Chart 2, page 7 and add 25% i.e., multiply 27.5 x 1.25 = 34.2 which is the final temperature factor. Now choose a SU64-4. Pressure drop is 2.9 ft.

An SU64-6 or an SU65-2 could also have been selected, with their respective pressure drops.

CONSTRUCTION FEATURES AND MATERIALS

DESIGN PRESSURES AT 375°F — **MATERIAL SPECIFICATIONS–Cast Iron and Brass Units**

SHELL DIAMETER	TUBESIDE (PSI)			TEST PRES. TUBES IN PSI	STANDARD UNIT		BRASS UNIT		SHELL	TUBES	TUBE SUPPORTS	NUTS & BOLTS
	2 PASS	4 PASS	6 PASS		HEAD	TUBE SHEET	HEAD	*** TUBE SHEET				
4"	150	150	N/A	300	CAST** IRON BONNET	STEEL	CAST BRASS BONNET	ROLLED NAVAL BRASS	STEEL	¾" O.D. COPPER	STEEL	STEEL
6"	150	150	150	300								
8"	150	150	150	300								
10"	125*	150	150	250 (2P) 300 (4P)								
12"	125*	125*	150	250 (2&4P) 300 (6P)								
14"	125*	125*	150	250								
16"	125*	125*		250								
18"	125*	125*		250								
20"	125*	125*		250								
22"	150	150		300	FABRICATED STEEL BONNET		NOT AVAIL. WITH BRASS HEAD					
24"	150	150		300								
26"	150	150		300								
28"	150	150		300								
30"	150	150		300								

*150 lb. cast iron heads available on special order.
**6-pass heads are fabricated steel, 14" through 20"

*** Temperature rating limited to 300° F. If higher rating required consult factory.

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TYPE "SU" HEAT EXCHANGER

TABLE A — CLEAN TUBE TEMPERATURE FACTORS

		SATURATED STEAM PRESSURE IN PSI GAUGE @ SEA LEVEL (SEE NOTE 1)											
Temp. in °F	Temp. out °F	0 p.s.i.	2 p.s.i.	5 p.s.i.	10 p.s.i.	15 p.s.i.	20 p.s.i.	30 p.s.i.	40 p.s.i.	50 p.s.i.	75 p.s.i.	100 p.s.i.	125 p.s.i.
40°	60	6.5	6.3	6.1	5.9	5.6	5.2	5.0	4.8	4.7	4.2	4.0	3.5
	80	13.4	12.5	12.2	11.0	10.5	10.0	9.0	8.8	8.1	7.9	7.5	6.9
	100	21.2	19.8	19.0	17.5	16.5	15.5	14.2	13.1	12.2	11.1	10.4	10.1
	120	29.4	27.0	26.2	24.5	22.5	21.5	19.5	18.5	17.5	15.7	14.5	14.0
	140	39.2	36.0	34.5	31.5	29.5	27.5	25.0	23.5	22.0	19.8	18.8	17.4
	160	51.9	48.0	44.5	40.0	37.0	35.0	31.0	29.0	27.2	24.0	22.7	21.0
	180	71.5	65.5	58.8	51.5	47.0	44.0	38.0	35.5	33.5	29.8	27.0	25.0
50°	70	6.6	6.4	6.2	6.0	6.7	5.3	5.1	4.9	4.7	4.3	4.1	3.5
	90	13.9	13.0	12.4	11.5	10.8	10.3	9.5	8.9	8.4	8.0	7.6	7.0
	110	21.6	20.6	19.3	17.8	16.8	15.7	14.5	13.6	12.9	11.4	10.7	10.2
	130	30.6	29.0	27.1	25.0	23.0	22.0	19.7	18.6	17.7	15.8	14.7	14.1
	150	41.8	39.3	36.2	32.4	30.1	28.3	25.6	24.0	22.5	20.1	18.9	17.6
	170	57.1	53.0	48.0	42.5	38.8	36.2	32.2	30.0	28.1	25.0	23.1	21.5
	190	84.0	74.5	65.2	55.5	50.0	46.0	40.0	38.0	35.0	32.0	28.0	26.0
60°	80	6.8	6.5	6.2	6.0	5.7	5.4	5.1	5.0	4.8	4.3	4.2	3.5
	100	14.3	13.2	12.6	12.0	11.3	10.6	10.0	9.0	8.7	8.0	7.7	7.0
	120	22.6	21.5	20.0	19.0	17.5	16.0	15.0	14.1	13.1	12.2	11.1	10.2
	140	32.4	30.0	28.3	26.0	24.0	22.5	20.0	18.8	18.0	15.8	15.0	14.1
	160	45.5	42.5	38.8	34.5	32.0	30.0	26.1	25.0	23.1	20.5	19.0	17.8
	180	65.0	58.5	52.8	45.0	42.0	39.5	33.5	31.7	29.5	25.8	23.8	22.0
	200	104.0	89.0	74.6	64.0	56.0	50.0	43.0	39.0	37.0	32.0	29.0	26.0
80°	100	7.5	7.0	6.7	6.4	6.0	5.7	5.2	5.1	4.9	4.4	4.3	3.6
	120	15.6	14.8	13.7	12.5	12.0	11.0	10.1	9.3	8.9	8.1	7.9	7.1
	140	25.7	23.5	22.4	20.0	18.5	17.0	15.5	14.5	13.6	12.4	11.3	10.5
	160	38.8	36.0	33.0	29.0	26.5	25.0	21.5	20.0	19.0	17.0	15.5	14.4
	180	58.0	52.5	46.7	40.0	36.5	34.0	29.5	27.0	25.2	22.0	20.0	18.8
	200	96.5	81.5	68.0	56.0	49.0	45.0	38.5	35.0	32.5	28.0	25.5	23.2
100°	120	8.5	8.0	7.5	7.0	6.2	5.9	5.3	5.2	5.0	4.5	4.4	3.6
	130	12.0	11.0	10.0	9.5	9.0	8.0	7.0	6.5	6.0	5.5	5.2	5.0
	140	18.5	17.5	15.9	14.0	13.0	12.2	10.6	10.0	9.2	8.2	8.1	7.3
	160	31.5	28.5	26.3	23.0	21.0	19.5	17.0	16.0	15.0	13.0	12.0	11.1
	180	50.3	46.0	40.0	34.5	31.0	28.5	24.5	22.5	21.0	18.2	16.5	15.2
	200	88.0	74.0	61.1	49.0	43.0	39.5	33.5	30.0	28.0	23.7	21.5	19.5
110°	120	4.0	3.8	3.5	3.3	3.0	2.7	2.5	2.3	2.1	2.0	1.8	1.5
	130	9.5	9.0	8.0	7.5	6.7	6.4	5.6	5.3	5.1	4.6	4.5	3.6
	140	14.8	13.0	12.2	11.0	10.0	9.0	8.5	7.5	7.0	6.5	6.0	5.4
	150	21.4	19.0	18.0	15.0	14.0	13.0	12.5	10.5	9.5	9.0	8.0	7.4
	160	28.0	26.0	23.0	20.0	18.0	17.0	15.0	13.0	12.5	11.7	9.8	9.0
	170	35.2	30.2	28.5	25.5	22.5	21.0	18.0	16.8	15.0	14.1	12.5	11.3
	180	47.5	43.0	38.0	32.0	28.0	25.5	23.0	21.0	19.5	16.8	15.0	13.7
	190	62.0	53.0	45.0	36.2	33.0	30.0	26.0	23.0	22.0	19.0	17.0	15.5
	200	85.0	71.0	57.5	46.0	41.0	36.5	31.0	27.5	25.5	21.5	20.0	18.8
120°	130	4.9	4.4	4.1	3.9	3.6	3.4	3.0	2.5	2.3	2.1	2.0	1.9
	140	10.1	9.2	8.5	7.8	7.0	6.7	6.0	5.4	5.1	4.6	4.5	3.7
	150	15.4	15.0	13.5	13.0	11.2	10.0	8.5	8.1	7.5	6.6	6.2	5.5
	160	23.0	21.0	18.9	16.2	14.0	13.5	12.0	11.0	10.5	9.1	8.5	7.5
	170	31.5	28.0	25.0	22.0	19.5	18.0	15.2	14.5	13.0	12.0	10.5	9.5
	180	41.7	37.0	32.5	27.5	24.5	22.5	19.0	17.5	16.1	13.8	12.9	11.7
	190	56.0	51.5	42.0	34.0	31.0	27.5	23.0	21.5	19.2	17.5	15.0	13.7
	200	78.8	66.0	53.3	42.5	37.0	33.0	28.0	25.0	23.0	19.5	17.5	16.2
130°	140	5.5	5.0	4.6	4.0	3.7	3.5	3.3	2.6	2.4	2.3	2.0	1.9
	150	10.9	10.6	9.4	8.4	7.5	6.9	6.1	5.7	5.1	4.6	4.5	3.7
	160	18.5	17.0	15.0	14.0	12.0	11.0	9.5	8.6	7.8	6.8	6.4	5.8
	170	27.0	24.0	21.0	18.5	16.0	15.0	13.0	11.5	10.8	9.3	8.6	7.8
	180	39.0	34.0	29.0	26.0	21.0	20.0	16.3	15.0	13.6	12.5	10.8	9.8
	190	53.0	45.0	38.0	32.0	27.5	25.0	21.0	19.0	17.0	14.8	13.2	12.2
	200	75.0	68.0	52.0	40.0	35.0	30.0	25.0	23.0	21.0	18.5	16.0	14.5
140°	150	6.2	5.5	5.1	4.2	3.8	3.6	3.5	2.8	2.6	2.4	2.1	2.0
	160	12.7	12.0	10.3	9.0	8.0	7.2	6.3	6.0	5.2	4.7	4.6	3.7
	170	21.0	19.0	16.5	14.5	12.5	11.5	10.0	9.0	8.0	7.0	6.5	6.0
	180	31.4	27.5	23.8	20.0	17.2	16.0	13.5	12.0	11.1	9.5	8.7	8.0
	190	46.0	39.0	32.5	30.0	23.0	21.0	17.5	15.5	14.2	13.0	11.0	10.0
	200	68.6	56.5	44.8	36.0	30.5	27.0	22.0	20.0	18.0	15.2	13.5	12.6
	210		86.0	62.0	47.0	39.2	32.5	28.0	24.0	22.5	19.5	16.5	15.0
	220			95.3	60.0	52.5	42.0	33.0	29.5	26.5	22.0	19.5	17.8
150°	160	7.0	6.5	5.8	5.0	4.0	3.8	3.5	3.2	3.0	2.6	2.4	2.0
	170	14.8	12.8	11.0	10.0	8.0	7.5	6.5	6.0	5.7	5.0	4.8	4.2
	180	25.0	22.5	19.0	15.5	13.8	11.8	10.8	9.2	8.8	7.0	6.7	6.2
	190	40.0	33.0	28.0	22.5	19.0	17.2	14.8	13.0	11.5	10.6	9.0	8.2
	200	52.0	51.0	39.0	30.0	26.5	23.0	18.5	17.0	15.8	13.0	11.8	10.5
	210		80.0	58.0	42.0	35.0	30.0	24.0	22.0	19.5	17.0	14.5	13.5
	220				58.0	42.5	39.0	31.0	27.0	23.5	21.0	17.5	16.0

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TABLE A CLEAN TUBE TEMPERATURE FACTORS (Continued)

		SATURATED STEAM PRESSURE IN PSI GAUGE @ SEA LEVEL (SEE NOTE 1)											
Temp. in °F	Temp. out °F	0 p.s.i.	2 p.s.i.	5 p.s.i.	10 p.s.i.	15 p.s.i.	20 p.s.i.	30 p.s.i.	40 p.s.i.	50 p.s.i.	75 p.s.i.	100 p.s.i.	125 p.s.i.
	170	8.3	7.2	6.3	5.8	4.5	4.2	3.9	3.2	3.1	2.7	2.5	2.1
	180	18.5	16.0	13.6	11.0	9.5	8.5	7.5	6.5	6.2	5.1	5.0	4.2
	190	32.4	27.5	22.5	19.7	15.3	13.7	11.3	10.1	9.3	7.9	6.9	6.5
160°	200	56.3	44.0	34.4	26.0	22.0	19.5	16.0	14.2	13.0	11.0	9.7	8.7
	210		73.0	51.0	37.5	31.0	26.5	22.0	19.0	17.5	14.5	12.5	11.5
	220			84.0	53.0	42.0	31.0	28.0	24.0	22.0	18.5	15.5	13.5
	180	10.0	9.0	8.0	6.0	5.5	5.0	4.2	3.5	3.2	3.0	2.8	2.2
	190	24.0	20.0	15.5	12.7	11.0	10.0	8.0	7.0	6.5	5.5	5.2	4.5
170°	200	47.0	36.5	28.0	21.0	17.7	15.2	12.8	11.0	10.5	8.6	8.0	7.0
	210		66.0	43.5	31.0	25.5	21.5	17.5	15.0	13.8	11.5	10.0	9.0
	220			77.0	46.5	38.0	31.0	25.0	21.5	18.5	16.0	13.5	12.0
	190	14.0	11.3	9.2	7.0	6.0	5.3	4.4	3.7	3.3	3.1	3.0	2.3
	200	36.6	27.8	20.6	15.0	12.5	11.0	9.0	8.0	7.0	6.0	5.5	4.7
180°	210	102.0	57.5	37.5	25.0	21.0	17.5	14.2	12.2	11.0	9.0	8.0	7.3
	220			70.0	41.5	32.0	27.5	21.0	18.0	15.5	13.0	11.0	9.5
	200	22.4	16.2	11.5	8.5	7.0	6.1	5.0	4.2	3.5	3.2	3.1	2.5
	210	87.5	45.5	28.2	18.5	15.0	12.5	9.7	8.6	7.8	6.3	5.8	5.0
190°	220			60.0	33.0	25.0	20.0	15.5	13.0	11.7	9.5	8.1	7.5
	230				61.0	34.0	31.0	23.0	19.0	16.5	13.5	11.5	10.5
	210	64.8	26.0	16.5	10.5	8.0	7.0	5.2	4.7	3.9	3.4	3.2	2.7
	220			48.5	24.8	18.0	15.0	11.0	9.1	8.2	6.6	6.0	5.1
200°	230				49.0	32.5	25.5	17.8	14.8	13.0	10.2	9.1	8.0
	240					62.0	42.0	26.0	23.0	21.0	15.5	12.5	11.0
	220			32.0	14.5	10.2	8.2	6.5	5.0	4.5	3.5	3.4	2.9
	230				39.0	24.5	18.5	13.0	10.5	9.2	7.2	6.2	5.3
210°	240					48.5	33.3	21.5	17.1	14.8	11.1	9.5	8.3
	250						63.0	45.0	26.0	22.0	17.5	13.0	11.5
	230				24.5	14.2	10.4	7.0	5.5	5.0	3.8	3.5	3.1
	240					38.0	25.0	15.2	12.4	10.4	8.0	6.5	5.7
220°	250						53.0	28.0	21.0	17.0	13.5	10.0	9.0
	260							47.0	32.0	25.0	19.5	14.5	12.5
	270								48.0	36.0	25.0	20.0	17.5
	240					27.0	15.0	9.0	7.0	5.5	5.0	3.5	3.0
	250						43.0	22.0	15.5	12.5	9.5	7.0	6.0
230°	260							39.0	26.0	20.0	14.5	11.5	10.0
	270								42.5	32.5	23.0	16.0	13.0
	280								76.0	45.0	30.0	22.5	17.0
	250						27.5	12.0	8.0	6.0	4.0	3.0	2.0
	260							30.0	19.0	14.0	9.5	7.5	6.5
240°	270								35.0	23.5	17.0	12.5	9.5
	280								67.0	39.0	25.0	17.0	14.2
	290									67.0	37.0	23.0	19.0
	260							18.5	11.0	7.5	5.0	4.0	3.0
	270							61.0	27.5	18.5	12.5	8.5	7.0
250°	280								60.0	32.0	21.0	14.0	10.0
	290									60.0	32.0	20.0	17.0
	300										48.0	28.0	23.0

NOTE 1. For altitudes above sea level, subtract 1 PSI for each 2,000 feet altitude to obtain correct steam pressure and determine temperature factor. Example: At 4,000 feet altitude and 2 PSIG steam pressure the corrected steam pressure would be $\left[2 \quad \frac{4,000}{2,000} \times 1\right] = 0$ PSIG. For resultant steam pressures thus obtained, interpolate.

NOTE 2. When necessary, interpolate between columns for approximate temperature factor. Consult factory if necessary for other temperature factors, or see page 6 for temperature factor calculation.

Pressure Drop Correction

Capacity tables show values for pressure drop when water at 100° F. average temperature is circulated. To correct these values for other temperatures, multiply by appropriate Correction Factor in Table B.

Ethylene Glycol (Anti-Freeze) Correction Factors

"SU" Capacity tables can also be used for heating 50% ethylene glycol and water solutions in the tubes with steam in the shell. Use the same selection procedure except multiply the corrected Temperature Factor from Step #2 by the appropriate Correction Factor from Table B. Also correct the pressure drop with the appropriate Correction Factor from Table B.

TABLE B CORRECTION FACTORS

Average Temperature in Tubes	Water	Anti-Freeze—50% Ethylene Glycol and Water		
	Pressure Drop Correction	Temperature Factor Correction	Pressure Drop Correction	Min. Tube Vel.
80° F.	1.06	1.38	1.6	6.0
100° F.	1.0	1.33	1.54	4.0
120° F.	.95	1.29	1.42	3.0
140° F.	.91	1.24	1.3	2.4
160° F.	.87	1.20	1.2	1.9
180° F.	.83	1.15	1.14	1.7
200° F.	.80	1.1	1.06	1.35
220° F.	.77	—	—	—
240° F.	.74	—	—	—
260° F.	.72	—	—	—
280° F.	.69	—	—	—
300° F.	.67	—	—	—

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TEMPERATURE FACTOR CALCULATION PROCEDURE

Use Chart 1 to determine clean tube Temperature Factor when requirements are not shown in Table A on Pages 4 and 5 or where accurate interpolation is not possible.

$$A = \frac{\text{Steam Temperature minus Inlet Water Temperature}}{\text{Steam Temperature minus Outlet Water Temperature}}$$

Example Problem:

Find Temperature Factor for 40° in, 140° out, 0 PSIG Steam (See Table C)

$$A = \frac{212 - 40}{212 - 140} = \frac{172}{72} = 2.4$$

Average water temperature in tubes $= \frac{40 + 140}{2} = 90°$

Therefore from Chart 1, clean tube Temperature Factor equals 39.2. (See dotted line)

CHART 1—TEMPERATURE FACTORS

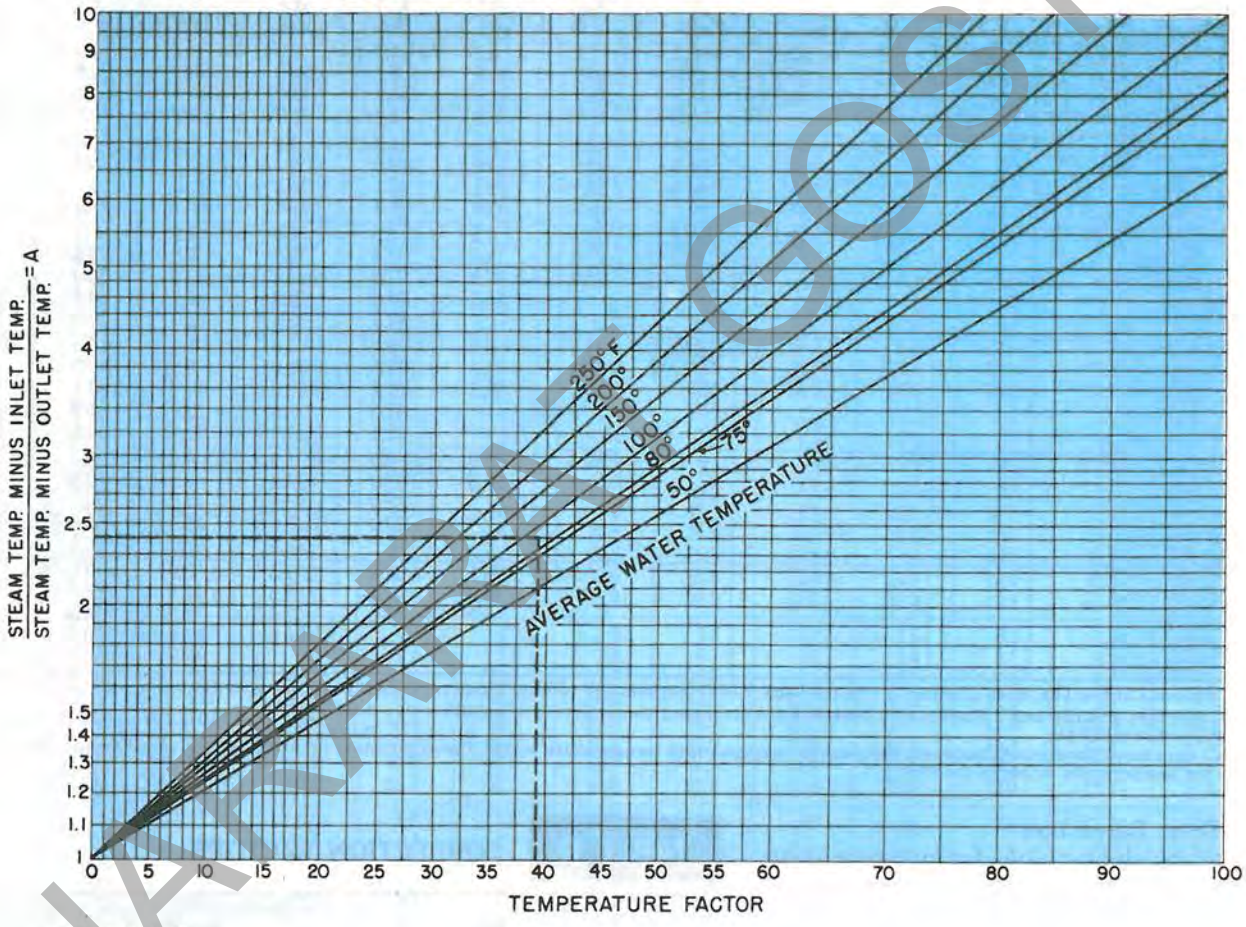


TABLE C

STEAM TABLE At Sea Level

Steam Pressure	Temp. °F.	Steam Pressure	Temp. °F.
0 PSIG	212°	30 PSIG	276°
2 PSIG	218°	40 PSIG	288°
5 PSIG	227°	50 PSIG	298°
10 PSIG	240°	75 PSIG	321°
15 PSIG	250°	100 PSIG	338°
20 PSIG	259°	125 PSIG	353°
25 PSIG	267°	150 PSIG	366°

HARRY GOSTAR

MISCELLANEOUS SELECTION HINTS

1. Water velocity in ft/sec. produced by flow through the tubes may be read at the bottom of each GPM column (Pages 8 through 16). A change in overall length of an "SU" does not change water velocity through the tubes.

2. Fouling Factors as set forth by TEMA (Tubular Exchanger Mfrs. Association) may be added by conversion to an equivalent percentage increase. (See Chart 2 at bottom of this page).

3. Ratings are omitted when they produce a water velocity through the tube of more than 7.5 ft/sec. Higher velocities are not shown for the following reasons:

   a. Water flow at velocities of 7.5 ft/sec. and above can become erosive. Rapid wear of the tubing is the result.

   b. Any small accumulation of scale in a unit that has been rated at high velocity causes a very sharp drop-off in heating capacity.

   c. The high pressure drop resulting from very high velocities can make pump selection difficult and costly.

4. When using an "SU" as an instantaneous water heater where human contact with the heated water is possible, low pressure steam (15 psi or less) at the heat exchanger is always recommended.

FOULING ALLOWANCE

1. Water from different localities varies in mineral content. In the process of being heated, the minerals are precipitated in the form of lime, scale, etc. They then collect on the tube walls and the ability of the unit to transfer heat is reduced.

2. To offset a loss in heater capacity from fouling, the size of the heater should be increased so that after scale has collected, the unit will still operate at its rated capacity. This is accomplished by adding a fouling factor to the clean tube factors shown in Table A.

TYPICAL FOULING FACTORS*

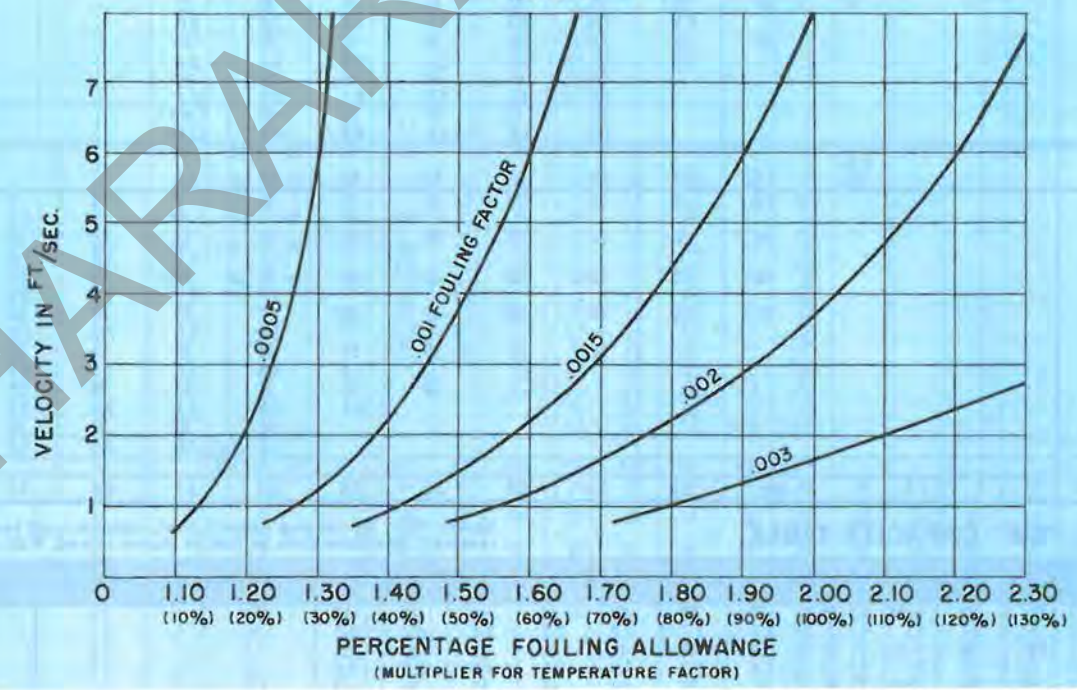
Temp. of Heating Medium	Up to 240°F.		240°-400°F.**	
Temp. of Water	125°F. or less		Over 125°F.	
TYPE OF WATER	Water Vel. ft/sec.		Water vel. ft/sec.	
	Less 3 ft.	Over 3 ft.	Less 3 ft.	Over 3 ft.
Sea Water	.0005	.0005	.001	.001
Distilled	.0005	.0005	.0005	.0005
Treated Boiler Feedwater	.001	.0005	.001	.001
Engine Jacket	.001	.001	.001	.001
City or Well (Great Lakes)	.001	.001	.002	.002
River Water:				
Karadj	.003	.002	.004	.002
Zayandehroud	.003	.002	.004	.003
Sepidrood	.003	.002	.004	.003

*Reproduced with permission from TEMA Standards 5th Edition 1968.
**Ratings in columns 3 and 4 are based on a temperature of the heating medium of 240°—400°. If the heating medium temperature is over 400° and the cooling medium is known to scale, these ratings should be modified accordingly.

FOULING FACTOR CONVERSION TO PERCENTAGE OF FOULING

To include a Fouling Factor in an "SU" selection, use Chart 2 (below) to find the equivalent percentage of fouling allowance to correct any clean tube temperature factor.

CHART 2



HARARI GOSTAR

TYPE "SU" HEAT EXCHANGER

4" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES											
	2	4	6	8	10	15	17	20	25	30	34	
SU42-4	34	28	21	18 1.8	15 2.5	11 6.0	10 7.0					
SU43-4	50	44	36 1.0	31 2.0	27 3.0	21 7.0	19 8.0					
SU44-4	70	60	51 1.2	44 2.2	40 3.5	29 8.0	27 9.0					
SU45-4	90	78	65 1.4	56 2.5	50 9.0	37 9.0	33 11.0					
SU46-4		92	77 1.5	67 2.8	60 4.5	45 10.0	40 13.0					
SU47-4			92 1.7	79 3.0	70 5.0	53 11.0	48 15.0					
Avg. Tube Vel. 4"—4-Pass	.9 ft./sec.	1.8	2.7	3.5	4.4	6.6	7.5					
SU42-2		16	13	12	11	9	8	6 1.1	5 1.4	4 1.8	3 2.2	
SU43-2		26	22	20	18	15	13	11 1.4	10 1.9	9 2.5	8 3.0	
SU44-2		34	31	28	25	21	19 1.0	17 1.7	15 2.4	13 3.2	11 3.8	
SU45-2		45	40	37	33	28	25 1.2	21 2.0	19 2.9	17 3.9	15 4.6	
SU46-2		55	49	45	40	34	31 1.4	26 2.3	24 3.4	20 4.6	17 5.4	
SU47-2		65	58	53	48	40	37 1.6	31 2.6	28 3.9	24 5.3	21 6.2	
Avg. Tube Vel. 4"—2-Pass		.9 ft./sec.	1.3	1.8	2.2	3.3	3.8	4.4	5.5	6.6	7.5	

6" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES															
	2	3	4	5	10	15	20	25	30	35	40	50	60	70	80	90
SU62-6		53	49	47	36 1.2	29 2.2	24 3.4	21 4.8	17 6.3							
SU63-6		84	77	73	53 1.6	44 2.9	36 4.5	31 6.6	25 8.6							
SU64-6				98	73 1.9	56 3.6	47 5.7	41 8.3	34 10.9							
SU65-6					92 2.4	72 4.3	60 6.9	51 10.1	42 13.2							
SU66-6						87 5.0	71 8.0	61 11.8	50 15.6							
SU67-6							84 9.2	72 13.6	59 17.9							
SU68-6							95 10.3	82 15.3	67 20.3							
Avg. Tube Vel. 6"—6-Pass	.5 ft./ sec.	.8	1.1	1.3	2.7	4.0	5.4	6.7	8.0							
SU62-4				37	31	26	22 1.0	18 1.5	16 2.0	14 2.7	13 3.4	10 4.1				
SU63-4				58	47	39	33 1.6	27 2.2	24 2.9	21 3.6	19 4.6	15 5.6				
SU64-4				78	63	53	44 1.7	37 2.9	32 3.8	29 4.7	26 6.1	21 7.5				
SU65-4				98	79	65 1.1	55 2.4	47 3.6	40 4.5	35 5.6	32 7.3	27 9.0				
SU66-4					95	78 1.6	66 2.8	56 3.9	48 5.4	43 6.8	38 8.7	30 9.8				
SU67-4							78 3.3	65 4.5	56 6.0	49 8.3	44 10.3	36 12.3				
SU68-4							88 3.5	75 5.0	64 7.0	56 9.2	50 11.5	40 14.5				
Avg. Tube Vel. 6"—4-Pass				.8 ft./ sec.	1.4	2.8	2.9	3.7	4.4	5.1	5.9	7.3			*	*
SU62-2					19	17	15	13	12	11	10	9	8	7 1.1	6 1.3	5 1.5
SU63-2					30	26	24	22	20	18	16	14 1.0	12 1.3	10 1.7	9 2.1	8 2.5
SU64-2					40	35	32	29	26	24	22	19 1.2	16 1.9	14 2.1	12 2.8	10 3.5
SU65-2					50	45	40	36	33	30	27 1.0	23 1.6	20 2.1	18 2.5	16 3.5	14 4.5
SU66-2							48	43	39	35 1.0	33 1.3	28 2.0	24 2.4	21 2.9	19 4.2	17 5.5
SU67-2									46	42 1.1	38 1.5	33 2.1	29 3.0	25 3.5	22 4.9	19 6.3
SU68-2											44 1.7	38 2.6	32 3.3	28 4.3	25 5.6	22 6.9
Avg. Tube Vel. 6"—2-Pass					.8 ft./ sec.	1.1	1.4	1.8	2.2	2.6	2.9	3.7	4.4	5.1	5.9	6.6

8" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																	
	4	6	8	10	15	20	25	30	35	40	50	60	70	80	100	120	140	160
SU82-6		51	48	46	40	36 1.2	32 1.7	29 2.2	26 2.8	24 3.4	20 4.8	16 6.3						
SU83-6		78	74	70	61 1.0	54 1.6	48 2.3	43 2.9	39 3.8	35 4.5	30 6.6	25 8.6						
SU84-6			96	92	81 1.2	72 1.9	65 2.8	58 3.6	52 4.8	47 5.7	39 8.3	32 10.9						
SU85-6						93 2.4	83 3.4	72 4.3	65 5.7	61 6.9	49 10.1	41 13.2						

*Require fabricated steel heads—consult factory for dimensions.

HARARAT GOSTAR

(Continued Next Page)

8" DIAMETER "SU" CAPACITY TABLE (Continued)

"SU" Number	G.P.M. HEATED IN TUBES																	
	4	6	8	10	15	20	25	30	35	40	50	60	70	80	100	120	140	160	180
SU86-6							96	86	78	71	60	51							
							3.9	5.0	6.7	8.0	11.8	15.6							
SU87-6								100	91	83	69	59							
								5.7	7.6	9.2	13.6	17.9							
SU88-6										94	80	69							
										10.3	15.3	20.3							
SU89-6											89	76							
											17.1	22.6							
Avg. Tube Vel. 8"—6-Pass	.52 ft./ sec.		.78	1.04	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.7	8.0		*				
SU82-4					38	34	30	27	25	23	21	18	15	13	12				
											1.0	1.5	2.2	2.8	3.6				
SU83-4					58	50	45	40	37	34	31	26	23	20	18				
										1.1	1.5	2.1	2.9	3.7	5.0				
SU84-4					77	68	61	55	50	46	42	36	31	27	24				
								1.0	1.1	1.6	1.8	2.6	3.7	5.0	6.4				
SU85-4					100	88	78	71	64	58	53	44	38	34	31				
								1.1	1.4	1.6	2.1	3.7	4.9	5.9	7.8				
SU86-4							95	85	77	70	64	55	47	41	37				
								1.3	1.6	2.0	2.6	4.2	5.4	7.4	9.2				
SU87-4								100	91	82	75	64	55	48	43				
									1.7	2.6	3.0	4.4	6.5	8.1	10.6				
SU88-4										93	86	73	63	55	48				
										2.9	3.4	5.0	7.0	8.9	12.0				
SU89-4											98	83	71	62	54				
											3.6	5.5	7.8	10.5	13.4				
Avg. Tube Vel. 8"—4-Pass				.8 ft./ sec.	1.2	1.6	2.0	2.4	2.8	3.2	4.0	4.8	5.6	6.4					*
SU82-2						19	18	17	16	15	13	12	11	10	9	8	7	6	5
																	1.1	1.4	1.7
SU83-2						29	27	25	24	22	20	18	16	15	13	12	10	9	8
																1.3	1.6	2.1	2.6
SU84-2						39	36	34	31	30	27	25	22	20	18	15	14	12	11
															1.2	1.6	2.1	2.8	3.5
SU85-2						48	45	42	39	38	34	31	28	25	22	19	17	15	13
														1.1	1.5	2.1	2.7	3.2	3.7
SU86-2									48	46	41	37	34	31	26	23	20	18	16
													1.0	1.2	1.8	2.4	3.2	3.9	4.6
SU87-2												44	40	37	31	27	24	21	18
													1.2	1.3	2.1	2.9	3.6	4.5	5.4
SU88-2														42	36	31	27	24	21
														1.4	2.4	3.2	4.1	5.3	6.5
SU89-2														48	40	35	30	27	24
														1.6	2.7	3.8	4.7	5.9	7.0
Avg. Tube Vel. 8"—2-Pass						.8 ft./ sec.	1.0	1.2	1.4	1.6	2.0	2.4	2.8	3.2	4.0	4.8	5.6	6.4	7.2

10" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																				
	10	15	20	25	30	35	40	50	60	70	80	90	100	120	140	160	180	200	225	250	275	300
SU102-6	50	45	41	39	35	32	30	26	23	21	19											
					1.0	1.3	1.5	2.0	2.7	3.4	4.2											
SU103-6	75	70	64	60	56	52	48	43	37	35	31											
					1.3	1.6	1.9	2.7	3.5	4.5	5.7											
SU104-6	100	93	86	80	75	69	64	56	50	45	41											
				1.1	1.6	1.9	2.4	3.3	4.4	5.6	7.2											
SU105-6				96	90	84	79	70	63	58	52											
				1.3	1.8	2.3	2.8	4.0	5.3	6.7	8.7											
SU106-6								85	75	68	63											
								4.6	6.1	7.9	10.2											
SU107-6								97	88	79	73											
								5.2	7.0	9.0	11.7											
SU108-6									100	90	82											
									7.9	10.1	12.2											
SU109-6										100	92											
										11.3	14.7											
SU1010-6											100											
											15.2											
Avg. Tube Vel. 10"—6-Pass				2 2 ft./ sec.	2.7	3.1	3.5	4.4	5.3	6.2	7.0											
SU102-4				32	30	28	26	23	21	19	17	15	14	12	10							
											1.1	1.4	1.7	2.4	3.2							
SU103-4				51	48	45	42	38	34	31	28	26	24	20	17							
									1.0	1.3	1.6	2.0	2.4	3.4	4.4							
SU104-4				69	64	60	56	50	45	41	37	34	32	27	24							
									1.2	1.7	2.1	2.6	3.1	4.3	5.6							
SU105-4				88	81	75	71	63	57	51	47	43	40	34	30							
								1.0	1.5	2.0	2.5	3.1	3.8	5.2	6.8							
SU106-4				100	96	90	84	75	67	61	56	52	48	41	36							
								1.3	1.8	2.4	3.0	3.6	4.5	6.1	8.0							
SU107-4							100	89	79	72	65	60	56	48	42							
							1.0	1.5	2.1	2.7	3.4	4.2	5.2	7.1	9.3							
SU108-4								100	92	84	76	70	64	53	47							
								1.6	2.3	3.0	3.9	4.9	5.9	8.1	10.5							
SU109-4										93	85	77	71	61	53							
										3.3	4.3	5.5	6.5	9.0	11.7							
SU1010-4											95	87	80	67	58							
											4.8	6.0	7.1	10.0	12.8							
Avg. Tube Vel. 10"—4-Pass					1.5 ft./ sec.	1.7	2.0	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0							
SU102-2								17	16	15	14	13	12	11	10	9	8.5	8	7	6.5	6.2	6
																					1.0	1.2
SU103-2								26	24	23	21	20	19	18	16	14	13	12	11	10	9.5	9
																			1.2	1.4	1.6	1.8
SU104-2								35	33	31	29	27	26	24	22	20	18	16	15	13.5	12.5	11.5
																	1.1	1.2	1.5	1.9	2.1	2.5
SU105-2								45	41	39	37	34	33	30	27	25	22	21	19	17.5	16	15
																1.1	1.3	1.5	1.9	2.4	2.8	3.2
SU106-2											45	42	40	36	32	30	27	25	23	21	19	18
															1.0	1.3	1.6	2.0	2.3	2.8	3.2	3.8
SU107-2													45	41	38	34	32	29	27	25	23	21
															1.2	1.5	1.8	2.3	2.6	3.3	3.8	4.4
SU108-2															43	39	37	34	31	28	26	24
															1.3	1.6	2.0	2.5	2.9	3.8	4.4	5.0
SU109-2																44	41	38	35	32	29	27
																1.9	2.4	2.9	3.4	4.3	4.8	5.6
SU1010-2																49	45	42	39	36	33	31
																2.1	2.6	3.2	3.6	4.7	5.4	6.2
Avg. Tube Vel. 10"—2-Pass								1.3 ft./ sec.	1.5	1.8	2.1	2.3	2.6	3.1	3.6	4.1	4.6	5.1	5.7	6.4	7.1	7.7

*Require fabricated steel heads—consult factory for dimensions.

HARARI GOSTAR

TYPE "SU" HEAT EXCHANGER

12" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																					
	25	30	40	50	60	70	80	90	100	110	120	130	140	160	180	200	225	250	300	350	400	450
SU123-6	80	76	65	56 1.4	50 2.0	45 2.5	41 3.1	37 3.6	34 4.5	31 5.2	28 5.9	26 6.7	24 7.7									
SU124-6		100	87 1.0	76 1.8	68 2.5	60 3.1	54 3.9	50 4.4	47 5.6	43 6.5	40 7.5	37 8.5	35 9.7									
SU125-6				95 2.1	83 2.9	74 3.7	68 4.6	62 5.3	58 6.8	53 7.8	50 9.0	47 9.2	44 11.8									
SU126-6					100 3.4	91 4.3	83 5.4	77 6.2	72 7.9	66 9.2	62 10.6	57 12.0	53 13.8									
SU127-6							97 6.1	89 7.1	83 9.0	77 10.5	72 12.2	67 13.8	62 15.9									
SU128-6								100 8.1	94 10.2	87 11.8	81 13.7	76 15.5	72 18.0									
SU129-6										96 13.2	90 15.3	84 17.3	80 20.0									
SU1210-6											98 16.8	92 19.1	87 22.1									
Avg. Tube Vel. 12"—6-Pass	1.3 ft. sec.	1.6	2.1	2.6	3.2	3.7	4.2	4.7	5.3	5.8	6.3	6.9	7.4									
SU123-4	62	58	51	46	42	38	35	33 1.0	30 1.2	28 1.5	26 1.7	24 2.0	22 2.3	20 2.9	18 3.5	17 4.4						
SU124-4	86	80	69	62	57	52	48	45 1.3	42 1.7	39 2.0	36 2.2	34 2.5	32 3.0	28 3.7	25 4.6	23 5.6						
SU125-4	100	95	85	78	71	66 1.0	61 1.3	56 1.7	52 2.0	49 2.3	45 2.6	42 3.1	40 3.7	35 4.5	32 5.3	29 6.8						
SU126-4				95	87 1.0	80 1.4	75 1.6	69 2.0	64 2.4	60 2.8	56 3.1	52 3.7	49 4.3	43 5.4	39 6.3	35 8.0						
SU127-4					100	92 1.5	86 1.8	80 2.2	74 2.7	69 3.1	64 3.5	60 4.3	57 4.9	50 6.1	45 7.2	41 9.3						
SU128-4							96 2.1	90 2.4	84 3.1	79 3.6	77 3.8	70 4.9	65 5.4	58 7.0	51 8.3	46 10.5						
SU129-4									96 3.3	90 4.0	84 4.4	79 5.4	74 6.3	65 7.7	58 9.2	52 11.7						
SU1210-4										100 4.5	94 4.9	88 6.0	82 7.0	72 8.1	64 10.2	57 12.9						
Avg. Tube Vel. 12"—4-Pass	1 ft./ sec.	1.1	1.5	1.75	2.1	2.5	2.8	3.1	3.5	3.8	4.1	4.3	4.8	5.5	6.1	7.0				*	*	*
SU123-2				29	28	26	25	24	23	22	21	20	19	18	17	16	15	13	12 1.0	10 1.3	9 1.6	8 2.0
SU124-2				39	37	35	33	31.5	30	29	28	27	26	24	22	21	19.5	18 1.0	16 1.3	14 1.7	12 2.1	11 2.6
SU125-2				49	47	44	42	40	39	37	36	34	33	30	28	27	25	23 1.2	20 1.6	18 2.2	16 2.7	14 3.3
SU126-2									47	45	43	41	40	37	35	32	30 1.1	28 1.5	24 2.0	21 2.6	19 3.2	17 3.9
SU127-2														43	40 1.0	38 1.2	36 1.4	33 1.6	28 2.3	25 3.1	22 3.8	20 4.7
SU128-2															47 1.1	44 1.3	41 1.5	38 1.9	33 2.6	29 3.6	26 4.3	23 5.3
SU129-2																50 1.4	46 1.6	43 2.2	37 3.0	32 4.1	29 4.9	26 6.0
SU1210-2																		47 2.4	41 3.2	35 4.4	32 5.4	29 6.7
Avg. Tube Vel. 12"—2-Pass					1 ft. sec.	1.2	1.3	1.5	1.7	1.8	1.9	2.1	2.3	2.6	3.0	3.3	3.7	4.2	5.0	5.8	6.7	7.5

14" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																							
	50	60	70	80	90	100	110	120	130	140	150	160	180	200	225	250	275	300	325	350	400	450	500	550	600
* SU143-6	65	58	53 1.2	49 1.5	45 1.8	41 2.2	38 2.6	35 3.0	33 3.5	31 4.0	28 4.5	27 5.0	24 6.2												
* SU144-6	87	78 1.2	71 1.6	65 2.0	60 2.5	55 3.0	51 3.5	48 4.1	46 4.7	43 5.4	40 6.1	38 6.8	35 8.4												
* SU145-6		97 1.5	89 2.0	80 2.5	74 3.1	68 3.8	64 4.5	60 5.2	56 6.0	53 6.8	50 7.7	48 8.7	43 10.7												
* SU146-6				97 3.1	90 3.8	83 4.6	79 5.4	74 6.3	70 7.3	66 8.3	62 9.3	59 10.5	52 12.9												
* SU147-6						97 5.3	91 6.3	86 7.3	81 8.5	77 9.6	72 10.4	69 12.2	61 15.0												
* SU148-6								97 8.4	92 9.7	87 11.1	81 12.5	78 14.0	71 18.0												
* SU149-6										96 12.5	90 14.1	87 15.9	79 20.0												
* SU1410-6											99 15.8	95 17.7	86 22.0												
Avg. Tube Vel. 14"—6-Pass	2.1	2.5	2.95	3.35	3.75	4.20	4.6	5.0	5.5	5.9	6.5	7.0	7.5												
SU143-4	50	47	44	41	39	37	35	33 1.0	31 1.2	30 1.3	28 1.5	27 1.6	25 2.0	23 2.4	20 2.9	18 3.4	17 4.0	15 4.9							
SU144-4	67	63	59	55	52	50	47	44 1.2	42 1.3	40 1.6	38 1.9	36 2.1	33 2.5	30 3.1	27 3.7	24 4.3	22 5.0	20 6.3							
SU145-4	86	80	76	71	67	63	60 1.0	56 1.5	54 1.7	51 2.0	48 2.3	46 2.5	41 3.1	38 3.8	34 4.0	30 5.3	27 6.3	24 7.7							
SU146-4	100	95	90	85	80 1.0	75 1.4	71 1.6	68 1.8	64 2.0	61 2.3	58 2.5	55 3.0	50 3.7	45 4.9	40 5.5	36 6.3	32 7.8	29 9.0							
SU147-4				100 1.0	95 1.2	90 1.5	85 1.8	81 2.0	77 2.2	73 2.5	69 3.0	65 3.4	60 4.2	54 5.2	48 6.0	43 7.2	38 9.2	35 10.4							
SU148-4						100 1.6	96 1.9	92 2.1	88 2.5	83 3.1	79 3.5	75 3.9	68 4.9	61 5.9	55 6.8	48 8.1	43 10.1	39 11.0							
SU149-4										100 3.1	89 3.2	84 4.2	76 5.3	68 6.5	60 8.0	54 9.2	48 11.0	43 13.2							
SU1410-4											98 3.6	92 4.7	85 6.0	75 7.1	68 8.6	60 10.2	53 12.0	49 14.5							
Avg. Tube Vel. 14"—4-Pass	1.25	1.5	1.75	2.0	2.25	2.5	2.75	3.0	3.25	3.50	3.75	4.0	4.5	5.0	5.6	6.2	6.9	7.5							

***Require Fabricated Steel Heads** Consult Factory for Dimensions.

HARRAT GOSTAR

TYPE "SU" HEAT EXCHANGER

14" DIAMETER "SU" CAPACITY TABLE (Continued)

"SU" Number	G.P.M. HEATED IN TUBES																								
	50	60	70	80	90	100	110	120	130	140	150	160	180	200	225	250	275	300	325	350	400	450	500	550	600
SU143-2						25	24.5	24	23.5	23	22.5	22	21	20	19	18	17	16	15	14	13	11	10	9	8
																						1.2	1.4	1.6	1.8
SU144-2						33	32	31.5	30.5	30	29	28	27	26	24.5	23	22	21	19.5	18.5	17	15	13.5	12	11
																					1.0	1.6	1.9	2.3	2.5
SU145-2						42	40.5	39.5	38	37	36	35	33	32	30	28	27	25	24	22.5	20	18.5	16.5	15	13.5
																				1.2	1.5	1.9	2.4	2.7	3.2
SU146-2						50	48	46	45	43.5	42	41	39	37	35	33	31.5	30	28.5	27	24.5	22	20	18.5	17
																		1.0	1.2	1.5	1.8	2.3	2.8	3.3	3.8
SU147-2													45	43	40	38	36.5	34	32.5	31	28	26	23.5	21.5	20
																1.0	1.2	1.3	1.4	1.7	2.0	2.6	3.3	3.8	4.3
SU148-2														49	46	43	41	39	37	35	32	29	26.5	24	22
																1.1	1.3	1.5	1.6	1.8	2.5	2.9	3.8	4.3	4.9
SU149-2																50	47	43.5	41.5	39	35	32	29	26.5	24
																1.2	1.4	1.7	1.9	2.2	2.9	3.3	4.3	4.9	5.6
SU1410-2																	52	49	46	43	39	35	32	29	27
																	1.6	1.8	2.1	2.4	3.1	3.8	4.7	5.4	6.2
Avg. Tube Vel. 14"—2-Pass						1.25	1.4	1.5	1.6	1.8	1.9	2.0	2.25	2.5	2.8	3.1	3.4	3.75	4.0	4.4	5.0	5.6	6.2	6.9	7.5

16" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																										
	50	70	80	90	100	110	120	130	140	150	160	180	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700	750	800
* SU163-6	76	62	58	54	51	47	44	42	39	37	35	32	28	25	23														
				1.1	1.3	1.6	1.8	2.1	2.4	2.7	3.0	3.7	4.5	5.5	6.6														
* SU164-6	100	85	78	73	68	63	59	56	53	50	48	44	40	36	33														
			1.2	1.5	1.8	2.1	2.5	2.8	3.2	3.7	4.1	5.0	6.1	7.5	9.0														
* SU165-6			97	91	84	78	73	69	66	62	60	55	50	46	42														
			1.5	1.9	2.3	2.7	3.1	3.6	4.1	4.6	5.2	6.4	7.7	4.5	11.4														
* SU166-6					100	95	89	85	81	77	74	68	62	56	51														
					2.7	3.2	3.8	4.3	4.9	5.6	6.3	7.7	9.2	11.5	13.8														
* SU167-6								99	94	89	86	79	72	65	59														
								5.1	5.8	6.5	7.3	9.0	10.9	13.4	16.2														
* SU168-6										100	97	89	81	74	69														
										7.4	8.4	10.4	12.5	15.4	18.6														
* SU169-6												99	90	83	77														
												11.7	14.1	17.4	21.0														
* SU1610-6													99	90	84														
													15.7	19.4	23.3														
Avg. Tube Vel. 16"—6-Pass	1.6	2.2	2.5	2.8	3.2	3.5	3.8	4.0	4.5	4.7	5.0	5.7	6.3	7.0	7.9			*	*	*	*								
SU163-4	54	49.5	48	46	44	42.5	41	39	38	36	35	32	30	27	24.5	22	20	18.5	17	15.5	14								
											1.0	1.3	1.5	1.8	2.3	2.5	3.0	3.5	4.2	4.4	4.9								
SU164-4	72	69	67	64	59	57	55	53	51	49	47	44	40	36.5	33	30	27	25	22.5	21.5	19								
									1.0	1.1	1.2	1.6	1.9	2.3	2.9	3.2	4.1	4.4	5.0	5.7	6.3								
SU165-4	92	85	81	78	75	72	69	66	63.5	61	58.5	54	50	45	41	37.5	34.5	31.5	29	27	25								
									1.0	1.3	1.5	1.9	2.3	2.7	3.6	3.9	4.6	5.3	6.5	6.9	7.7								
SU166-4		96	92.5	90	86	83	80	77	74	71.5	69	64	59.5	54	49.5	44.5	42	38.5	35	32.5	30								
						1.0	1.2	1.4	1.5	1.6	1.8	2.3	2.8	3.3	4.2	4.6	5.8	6.3	7.2	8.1	9.0								
SU167-4					100	96	93	89.5	86	83	80	74	69	62.5	57	52.5	48	44	41	37.5	35								
					1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.7	3.1	3.7	4.6	5.4	6.7	7.3	8.8	9.4	10.1								
SU168-4								100	97	94	91	86	78	71	65	60	55	50.5	46.5	43.5	40								
								1.6	1.9	2.0	2.2	2.8	3.7	4.4	5.4	6.3	7.7	8.2	9.8	10.6	11.8								
SU169-4											100	94	87	80	73.5	67.5	62	57.5	53	49.5	46								
											2.4	3.0	3.9	5.0	6.0	6.9	8.4	9.2	10.7	12.0	13.2								
SU1610-4													97.5	89.5	81.5	75	69.5	64.5	59	55	51								
													4.2	5.6	6.6	7.8	9.3	10.2	12.0	13.2	14.5								
Avg. Tube Vel. 16"—4-Pass	1 ft./ sec.	1.4	1.6	1.8	1.9	2.1	2.3	2.5	2.7	2.8	3.0	3.4	3.8	4.3	4.8	5.3	5.7	6.2	6.7	7.1	7.6							*	*
SU163-2					26	25	24.5	24	23.5	23	22.5	21.5	20.5	19.5	18.5	17.5	17	16	15	14.5	14	13	12	11	10	9.5	8.5	8	7
																								1.0	1.2	1.3	1.5	1.7	1.9
SU164-2					36	35	34	33	32	31.5	30.5	29	28	26.5	25	24	23	21.5	20.5	19.5	19	17	16	14.5	13.5	12.5	11.5	11	10
																						1.0	1.2	1.4	1.6	1.8	2.1	2.3	2.5
SU165-2					46	44.5	43.5	42	41	40	39	37	35	33.5	31.5	30	29	28.5	26	25	24	22	20	18.5	17	16	14.5	13.5	12.5
																						1.2	1.4	1.7	2.0	2.3	2.7	2.9	3.2
SU166-2													42	39.5	37.5	35.5	34	32.5	31	29.5	28	26	24	22	20.5	19	17.5	16	15
																					1.0	1.5	1.8	2.1	2.4	2.7	3.0	3.5	3.9
SU167-2													51	47.5	45	42.5	40	38.5	36.5	35	33	30.5	28	26	24	22	20	18.5	17
																		1.0	1.1	1.3	1.4	1.7	2.0	2.4	2.8	3.2	3.7	4.0	4.5
SU168-2																	46	43.5	41.5	39.5	38	35	32	30	27.5	25.5	23.5	21.5	20
																		1.0	1.2	1.4	1.5	1.9	2.3	2.7	3.2	3.7	4.3	4.7	5.1
SU169-2																					43	39.5	36	33	31	29	26.5	24.5	23
																					1.7	2.2	2.6	3.1	3.6	4.2	4.7	5.3	5.7
SU1610-2																					48	44	40	37	34	31.5	29	27	25
																					1.9	2.4	2.9	3.4	3.9	4.6	5.2	5.8	6.3
Avg. Tube Vel. 16"—2-Pass					.9 ft./ sec.	1.0	1.1	1.2	1.3	1.4	1.5	1.7	1.8	2.0	2.3	2.5	2.7	3.0	3.2	3.5	3.7	4.2	4.6	5.0	5.4	5.9	6.4	6.8	7.4

***Require Fabricated Steel Heads** Consult Factory for Dimensions.

HARRATGOSTAR

TYPE "SU" HEAT EXCHANGER

18" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																													
	100	110	120	130	140	150	160	180	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700	750	800	850	900	950	1000
* SU183-6	59	56 1.0	53 1.1	51 1.3	49 1.5	46 1.7	44 1.9	40 2.3	37 2.8	33 3.4	30 4.1	27 4.9	25 5.7	23 6.5															
* SU184-6	80 1.1	76 1.3	72 1.5	69 1.7	65 2.0	62 2.3	59 2.5	54 3.1	50 3.7	46 4.6	42 5.6	39 6.6	36 7.7	34 8.9															
* SU185-6	100 1.4	94 1.6	89 1.9	84 2.2	80 2.5	76 2.9	72 3.2	67 3.9	62 4.8	57 5.7	52 7.1	49 8.4	45 9.8	42 11.2															
* SU186-6				101 2.7	96 3.1	92 3.5	89 3.9	82 4.8	77 5.7	70 7.1	65 8.5	60 10.1	55 11.8	51 13.6															
* SU187-6								96 5.6	89 6.7	82 8.3	76 10.0	70 11.8	64 13.8	60 15.9															
* SU188-6									100 7.7	92 9.5	85 11.5	79 13.6	74 15.8	69 18.3															
* SU189-6											94 12.9	88 15.3	82 17.9	77 20.6															
* SU1810-6												96 17.1	90 20.0	84 23.0															
Avg. Tube Vel. 18"—6-Pass	2.4 ft. /sec.	2.7	2.9	3.2	3.4	3.6	3.9	4.3	4.8	5.4	6.0	6.6	7.2	7.8 *	*	*	*	*	*										
SU183-4	54	51	49	47.5	45.5	43.5	42	39	36	32.5 1.0	30.5 1.5	28.5 1.7	26 2.0	23 2.3	21 2.8	20 3.0	19 3.3	17 4.3	16 4.9										
SU184-4	67	63	61	58	56	54	52	48.5 1.0	46 1.2	41 1.6	39 1.8	37 2.0	34 2.6	30 3.1	28.5 3.3	27.5 3.6	25 4.2	23 5.1	21 6.2										
SU185-4	80	75	73	69.5	67	65 1.0	62 1.1	58 1.3	55 1.5	49.5 1.9	47 2.3	44 2.6	41 3.1	37 3.7	35 4.0	33.5 4.9	31 5.2	28.5 6.6	26 7.8										
SU186-4	95	90	88	85	82 1.0	80 1.1	77 1.2	72 1.5	67 1.8	61 2.3	57 2.7	53.5 3.0	50 3.7	45 4.4	43.5 4.7	41 5.4	38 6.1	35.5 7.5	33 8.9										
SU187-4				96 1.0	94 1.1	91 1.3	87 1.4	82 1.7	78 2.2	71.5 2.6	67 3.1	62.5 3.6	58 4.3	54.5 5.0	51 5.4	48 6.4	45 7.0	41 8.5	38 10.3										
SU188-4								97 1.8	91 2.3	82 3.0	76 3.6	71 3.9	66 4.8	61 5.8	58 6.2	55 7.2	52 7.9	47.5 9.7	44 11.6										
SU189-4										95 3.0	86 3.8	79 4.5	73.5 5.4	69 6.1	64.5 7.2	61 8.2	58 8.9	53.5 10.8	50 12.9										
SU1810-4												93 5.3	85 5.8	78 7.0	73 8.0	69 8.9	65 9.8	59 12.1	55 14.3										
Avg. Tube Vel. 18"—4-Pass	1.5 ft. /sec.	1.7	1.8	2.0	2.1	2.2	2.4	2.8	3.0	3.3	3.7	4.2	4.5	5.0	5.3	5.7	6.0	6.7	7.5					*	*	*	*	*	*
SU183-2									25	23.5	23	22	21	20.5	19.5	18.5	18	16.5	15	14.5	13.5	12.5	12 1.1	11.5 1.2	11.2 1.4	10.8 1.5	10.5 1.7	10.2 1.8	10 2.0
SU184-2									32	30	28.5	27	26	25	23.5	23	22	20.5	19	18 1.0	17 1.1	16 1.2	16.5 1.5	14.5 1.7	14 1.9	13.5 2.0	13 2.2	12.5 2.5	12 2.7
SU185-2									39	37	35	33.5	32	30	29	28	27	25	24 1.0	22 1.2	21 1.4	20 1.6	19 1.8	18 1.9	17 2.3	16.5 2.5	16 2.8	15.5 3.1	15 3.4
SU186-2									46	43.5	41	39	37	35	33.5	32.5	31.5	29.5 1.0	27.5 1.2	25.5 1.5	24.5 1.7	23 1.8	22 2.2	21 2.5	20 2.8	19.5 3.0	19 3.4	18.5 3.7	18 4.0
SU187-2													42	40.5	39	37.5	36	33.5 1.1	31.5 1.4	29.5 1.7	28 2.0	26.5 2.2	25.5 2.6	24.5 2.9	23.5 3.3	22.5 3.5	22 4.0	21 4.4	20.5 4.7
SU188-2													48	46	44	42	41 1.0	38 1.3	36 1.5	33.5 1.8	32 2.2	30.5 2.5	29 2.9	28 3.2	27 3.7	26 3.9	25 4.6	24.5 4.9	24 5.4
SU189-2																	46 1.2	42.5 1.5	40 1.7	37.5 2.1	36 2.3	34 2.8	32 3.2	31 3.6	30 4.2	29 4.4	28 5.1	27.5 5.5	27 6.1
SU1810-2																			44 1.8	42 2.3	40 2.7	37.5 3.2	36 3.6	34.5 4.0	33 4.6	32 4.9	31 5.7	30 6.1	29 6.7
Avg. Tube Vel. 18"—2-Pass									1.5 ft. /sec.	1.7	1.9	2.1	2.3	2.5	2.6	2.8	3.0	3.3	3.7	4.1	4.4	4.8	5.2	5.6	6.0	6.3	6.7	7.1	7.4

20" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																																		
	100	120	130	140	150	160	180	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400
* SU203-6	70	63	60	58	55 1.0	53 1.1	50 1.4	46 1.7	42 2.0	39 2.5	36 2.9	33 3.4	31 3.9	28 4.4	27 5.0	25 5.6																				
* SU204-6	94	86	81 1.0	78 1.2	75 1.4	72 1.5	68 1.9	62 2.2	57 2.8	52 3.3	49 4.0	46 4.6	43 5.3	40 6.1	38 6.9	36 7.7																				
* SU205-6			100 1.3	98 1.5	94 1.7	89 1.9	82 2.4	76 2.8	70 3.5	65 4.2	60 5.0	57 5.8	53 6.7	50 7.7	48 8.7	45 9.7																				
* SU206-6							100 2.9	92 3.4	86 4.2	80 5.1	75 6.0	70 7.0	66 8.1	62 9.3	59 10.5	55 11.7																				
* SU207-6									100 5.0	93 6.0	87 7.1	82 8.3	77 9.5	72 10.0	69 12.3	64 14.0																				
* SU208-6											98 8.1	93 9.5	87 11.0	81 12.5	77 14.0	74 16.0																				
* SU209-6													96 12.3	90 14.0	86 15.4	82 18.0																				
* SU2010-6														99 15.7	94 18.0	90 20.0																				
Avg. Tube Vel. 20"—6-Pass	1.8 ft./ sec.	2.2	2.4	2.5	2.7	2.9	3.3	3.6	4.0	4.5	5.0	5.4	5.9	6.3	6.8	7.2																				

***Require Fabricated Steel Heads.** Consult Factory for Dimensions.

HARARAT GOSTAR

TYPE "SU" HEAT EXCHANGER

20" DIAMETER "SU" CAPACITY TABLE (Continued)

"SU" Number	G.P.M. HEATED IN TUBES																																										
	100	120	130	140	150	160	180	200	225	250	275	300	325	350	375	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400
SU203-4	49	46.5	45	44	43	42	40	38	35	33	31	29 1.1	27 1.3	25.5 1.5	24.5 1.7	22 2.0	20 2.4	17 3.0	15.5 3.4	13 3.8	11.5 4.5	10 5.1																
SU204-4	65	61	60	58	56.5	55.5	53	50	47	44 1.0	42 1.2	39 1.5	37 1.8	35 1.9	33 2.2	31 2.5	27.5 3.1	24 3.7	21.5 4.3	19 5.0	17.5 5.7	15 6.2																
SU205-4	83	77.5	76	74	72	70	66	63 1.0	59 1.2	56 1.3	53 1.5	50 1.8	46 2.2	44 2.4	42 2.6	39 3.0	35 3.7	31.5 5.0	28.5 5.3	26 6.0	23.5 7.0	21 7.9																
SU206-4		94	92	89	87	85	80	75 1.2	71 1.4	67 1.6	63 1.9	60 2.1	55.5 2.6	52.5 2.8	49.5 3.1	47 3.6	42 4.4	37.5 5.2	34 6.2	30 7.4	28 8.0	25.5 9.1																
SU207-4					97	95	91 1.0	87 1.2	82 1.5	78 1.8	74 2.0	70 2.5	65 3.0	62 3.2	59 3.5	55 3.7	49.5 5.1	44 6.0	40 7.1	36 7.7	32.5 9.7	29.5 10.6																
SU208-4							100 1.0	97 1.2	93 1.6	88 1.9	85 2.3	80 2.8	75 3.3	71.5 3.6	68 4.0	64.5 4.6	57.5 5.8	51.5 7.0	46.5 8.2	42 9.6	38 10.6	34 12.0																
SU209-4										98.5 2.0	95 2.6	90 3.4	85 3.7	81.5 4.1	78 4.6	74 5.0	66 6.4	60 7.8	53.5 9.0	48 10.6	43.5 12.0	39 13.5																
SU2010-4												100 3.4	95 3.7	90 4.5	87 4.9	82 5.7	73 7.1	66 8.5	59 10.0	53 11.8	48 13.6	43 15.0																
Avg. Tube Vel. 20"—4-Pass	1.1 ft./ sec.	1.3	1.4	1.5	1.6	1.8	2.0	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.2	4.5	5.0	5.6	6.1	6.6	7.1	7.8											*	*	*	*
SU203-2								25	24	23.5	22.5	22	21	20.5	20	19	18	17	16	15	14.5	14	13	12.5	11.5	11	10.5 1.1	10 1.2	9.5 1.2	9 1.3	8.5 1.5	8.2 1.6	8 1.7	7.5 1.8	7.2 1.9	7 2.0
SU204-2								33	31.5	30.5	30	29	28	27	26.5	26	24.5	23	21.5	20.5	19.5	18.5	18 1.0	17 1.1	16 1.2	15 1.3	14.5 1.5	14 1.6	13 1.7	12 1.8	11.5 2.0	11 2.1	10.5 2.2	10 2.4	9.5 2.6	9 2.7
SU205-2								44	42	40.5	39	37	36	35	33.5	32.0	30.5	29	27	26	24.5	23 1.0	22 1.1	21 1.3	19.5 1.4	18.5 1.6	17.7 1.8	17 1.9	16 2.0	15.5 2.2	14.5 2.4	14 2.5	13 2.7	12.5 3.0	12 3.2	11.5 3.4
SU206-2										47	45	44	42.5	41	39.5	38.5	36	34	32.5	31	29.5 1.1	28 1.2	26.5 1.5	25 1.6	24 1.8	23 1.9	22 2.1	21 2.2	20 2.6	19 2.7	18 2.9	17 3.0	16.5 3.3	15.5 3.6	15 3.8	14 4.1
SU207-2												50	48	46	44.5	43	41	38	36.5	35 1.2	33 1.3	31.5 1.4	30 1.7	28.5 1.8	27.5 2.1	26 2.3	25 2.5	24 2.6	22.5 2.8	21.5 3.2	20.5 3.4	20 3.5	19 4.0	18 4.2	17 4.5	16 4.7
SU208-2																50	47	44	42 1.1	40 1.3	37.5 1.5	36 1.6	34 1.9	32.5 2.1	31 2.4	29.5 2.6	28 2.8	27 3.0	25.5 3.2	24.5 3.6	23.5 3.8	22 3.9	21 4.3	20 4.8	19 5.1	18 5.4
SU209-2																		50 1.0	47.5 1.2	45 1.5	42.5 1.6	40.5 1.8	38.5 2.1	36.5 2.3	34.5 2.6	33 2.9	31.5 3.1	30 3.5	28.5 3.9	27 4.1	26 4.3	24.5 4.4	23.5 5.0	22.5 5.4	21 5.8	20 6.1
SU2010-2																				50 1.5	48 1.7	45.5 2.0	43 2.3	41 2.6	38.5 3.0	37 3.3	35 3.5	33 3.8	31.5 4.2	30 4.5	28.5 4.8	27 5.0	26 5.5	24.5 6.0	23.5 6.3	22 6.7
Avg. Tube Vel. 20"—2-Pass								1.1 ft./ sec.	1.2	1.4	1.6	1.7	1.8	1.9	2.1	2.2	2.4	2.7	3.0	3.3	3.6	3.8	4.1	4.4	4.6	4.9	5.2	5.5	5.7	5.9	6.2	6.5	6.7	7.0	7.3	7.6

22" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																																										
	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800
SU224-6		86	72 1.6	62 2.3	54 3.2	48 4.2	44 5.3	39 6.6	36 7.9																												
SU225-6			91 2.0	76 2.9	67 4.1	60 5.3	54 6.8	49 8.3	45 10.1																												
SU226-6				92 3.6	82 4.9	73 6.5	67 8.2	60 10.0	54 12.1																												
SU227-6					95 5.8	86 7.6	78 9.6	70 11.8	63 14.3																												
SU228-6						97 8.7	87 11.0	79 13.6	73 16.4																												
SU229-6							97 12.4	88 15.3	81 18.5																												
SU2210-6								96 17.1	88 21.0																												
Avg. Tube Vel. 22"—6-Pass		2.2 ft./ sec.	2.9	3.7	4.4	5.1	5.9	6.6	7.3																												
SU224-4		72	65	55	50	44 1.2	40 1.5	37 1.9	34 2.3	31 2.7	29 3.2	27 3.6	25 4.1	24 4.7	22 5.3																							
SU225-4		90	80	68	62 1.2	55 1.5	51 1.9	46 2.4	43 2.9	39 3.4	36 4.0	34 4.6	31 5.3	30 5.9	28 6.7																							
SU226-4			94	81 1.0	75 1.4	66 1.9	61 2.4	55 2.9	51 3.5	46 4.1	43 4.8	40 5.6	38 6.4	37 7.2	34 8.0																							
SU227-4				96 1.2	87 1.7	78 2.2	72 2.8	65 3.4	60 4.1	55 4.9	51 5.7	48 6.5	45 7.5	43 8.4	40 9.4																							
SU228-4					100 1.9	88 2.5	81 3.2	74 3.9	69 4.7	62 5.6	57 6.5	54 7.5	51 8.6	49 9.7	45 10.8																							
SU229-4						99 2.8	91 3.6	83 4.4	78 5.3	70 6.3	65 7.3	61 8.5	58 9.7	55 10.9	52 12.2																							
SU2210-4							100 4.0	92 4.9	86 5.9	78 7.0	72 8.2	68 9.4	64 10.7	61 12.1	57 13.6																							
Avg. Tube Vel. 22"—4-Pass		1.4 ft./ sec.	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.5	5.9	6.4	6.8	7.3																						

***Require Fabricated Steel Heads.** Consult Factory for Dimensions.

22" UNITS CONTINUED NEXT PAGE

HARRIS STAR

TYPE "SU" HEAT EXCHANGER

22" DIAMETER "SU" CAPACITY TABLE (Continued)

"SU" Number	G.P.M. HEATED IN TUBES																																								
	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1550	1600	1650	1700	1750	1800
SU224-2						32	31	29	27	26	25	23	22	21.5	21	19.5	18.5	18 1.0	17 1.1		16 1.3		15 1.5		14 1.7		13 2.0		12 2.2		11.5 2.5		11 2.8		
SU225-2						40	38	36	35	33	32	29	28	27	26	25 1.0	24 1.1	23 1.2	22 1.4		20 1.6		19 1.9		18 2.2		16 2.5		15 2.8		14.5 3.1		14 3.5		
SU226-2						48	45	44	42	41	38	35	34	33 1.0	32 1.1	30 1.2	29 1.4	28 1.5	27 1.6		25 2.0		23 2.3		22 2.6		20 3.0		19 3.4		18 3.8		16 4.2		
SU227-2						56	52	50	48	46	44	40	39 1.0	38 1.2	37 1.3	35 1.5	33 1.6	32 1.8	31 1.9		29 2.3		27 2.7		25 3.1		23 3.5		22 4.0		21 4.4		19 5.0		
SU228-2						64	60	57	54	52	50	46 1.0	45 1.2	43 1.3	42 1.5	39 1.7	38 1.8	36 2.0	35 2.2		33 2.6		30 3.1		29 3.5		26 4.0		25 4.6		23 5.1		21 5.7		
SU229-2						72	68	65	62	59	56 1.0	52 1.2	50 1.3	48 1.5	47 1.7	44 1.9	42 2.1	41 2.3	39 2.5		37 3.0		34 3.5		32 4.0		30 4.5		28 5.1		26 5.8		24 6.4		
SU2210-2						81	75	71	68	65 1.0	62 1.1	58 1.3	56 1.5	54 1.7	52 1.9	49 2.1	47 2.3	45 2.5	44 2.8		41 3.3		38 3.9		36 4.4		33 5.1		31 5.7		29 6.4		27 7.2		
Avg. Tube Vel. 22"—2-Pass						1.6 ft./ sec.	1.8	2.0	2.2	2.4	2.6	2.9	3.1	3.3	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.2	6.4	6.6	6.8	7.0	7.3	7.5	7.7	7.9

24" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																																								
	200	225	250	275	300	325	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
SU244-6	59 1.1	55 1.3	52 1.6	49 1.9	46 2.2	44 2.5	41 2.9	37 3.7	33 4.5	30 5.4	27 6.4	25 7.5																													
SU245-6	80 1.4	75 1.7	70 2.0	66 2.4	62 2.8	58 3.2	55 3.7	50 4.6	46 5.7	42 6.9	39 8.2	36 9.5																													
SU246-6	100 1.6	94 2.0	88 2.4	81 2.9	76 3.4	72 3.9	69 4.4	62 5.6	57 6.9	53 8.4	49 9.9	45 11.5																													
SU247-6				98 3.4	92 4.0	88 4.6	84 5.2	77 6.6	71 8.1	65 9.8	60 11.6	55 13.6																													
SU248-6							98 6.0	89 7.9	83 9.3	76 11.3	70 13.3	65 15.6																													
SU249-6								100 8.6	93 10.6	85 12.7	79 15.1	74 17.6																													
SU2410-6										95 14.2	88 16.8	82 19.6																													
Avg. Tube Vel. 24"—6-Pass	2.4 ft./ sec.	2.7	3.0	3.3	3.6	3.9	4.1	4.8	5.4	6.0	6.5	7.1																													
SU244-4	53	51	49	46	44	41	40 1.0	36 1.3	34 1.5	30 1.8	26 2.1	25 2.4	24.5 2.7	23 3.1	22 3.5	21 3.9	20 4.3	19 4.7	18 5.2	17																					
SU245-4	68	66	63	60	57	54	52 1.3	47 1.6	44 1.9	40 2.3	37 2.7	34 3.1	32 3.5	30 4.0	29 4.4	27 4.9	26 5.5	24 6.0	23 6.5	22																					
SU246-4	86	81	77	74	70	67 1.1	63 1.3	58 1.6	54 1.9	50 2.3	46 2.8	43 3.2	41 3.7	38 4.3	36 4.8	34 5.4	32 6.0	30 6.7	29 7.3	27 8.0																					
SU247-4	100	96	92	87 1.0	83 1.1	79 1.3	76 1.5	70 1.9	64 2.3	59 2.8	55 3.3	51 3.8	48 4.4	45 5.0	43 5.7	40 6.4	39 7.1	37 7.8	35 8.6	33 9.4																					
SU248-4					98 1.3	94 1.5	90 1.7	82 2.1	76 2.6	70 3.2	65 3.8	60 4.4	57 5.1	53 5.8	51 6.5	48 7.3	46 8.2	43 9.0	41 9.9	39 10.4																					
SU249-4								94 2.4	87 3.0	80 3.6	74 4.3	69 5.0	65 5.7	60 6.5	58 7.4	54 8.3	52 9.2	49 10.2	47 11.2	44 12.2																					
SU2410-4									97 3.3	90 4.0	83 4.8	78 5.6	73 6.4	68 7.3	65 8.2	61 9.2	58 10.3	55 11.4	53 12.5	50 13.6																					
Avg. Tube Vel. 24"—4-Pass	1.7 ft./ sec.	1.8	1.9	2.1	2.2	2.4	2.6	3.0	3.3	3.7	4.1	4.5	4.8	5.2	5.6	5.9	6.3	6.8	7.1	7.6																					
SU244-2								27	26	25	24	23	22	21	19	18.5	18	17	16.5	16	15	14 1.0	13 1.1	12 1.3	11 1.5	10 1.7	9 1.8	8.5 2.0	8 2.3	7.5 2.5
SU245-2								33	32	31	29	27	26	25	24	23	22	21.5	21	20	19 1.1	18 1.3	17 1.5	16 1.7	15 1.9	14 2.1	13 2.4	12 2.6	11.5 2.9	11 3.2
SU246-2								42	40	38	36	35	33	32	31	29	28	27	26 1.0	25 1.1	24 1.3	22 1.6	21 1.8	19 2.0	18 2.3	17.5 2.6	16.5 2.9	15.5 3.2	15 3.5	14 3.8
SU247-2								50	48	45	44	42	41	38	37	35	34 1.0	33 1.1	32 1.2	31 1.3	29 1.6	27 1.8	25 2.1	24 2.4	22 2.7	21 3.0	20 3.4	19 3.7	18 4.1	17 4.5
SU248-2								58	55	52	50	48	46	44	42	40 1.0	39 1.1	38 1.3	37 1.4	35 1.5	33 1.8	31 2.1	29 2.4	27 2.8	26 3.1	25 3.5	23 3.9	22 4.3	21 4.7	20 5.2
SU249-2								67	63	60	57	54	52	50	48 1.0	46 1.2	45 1.3	43 1.4	42 1.6	40 1.7	38 2.0	36 2.4	33 2.7	31 3.1	30 3.5	28 4.0	26.5 4.4	25 4.9	24 5.4	22 5.9
SU2410-2								75	71	68	65	62	59	56 1.0	54 1.2	52 1.3	50 1.4	48 1.6	47 1.8	45 1.9	42 2.3	40 2.7	37 3.1	35 3.5	33 3.9	32 4.4	30 4.9	28 5.4	27 6.0	25 6.6
Avg. Tube Vel. 24"—2-Pass								1.5 ft./ sec.	1.7	1.8	2.0	2.2	2.4	2.6	2.8	2.9	3.1	3.3	3.5	3.7	4.0	4.3	4.7	5.1	5.4	5.8	6.2	6.5	6.8	7.3

HARARAT GOSTAR

TYPE "SU" HEAT EXCHANGER

26" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	G.P.M. HEATED IN TUBES																																					
	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500
SU264-6	57 1.2	52 1.7	47 2.2	42 2.7	38 3.4	35 4.1	32 4.8	29 5.6	27 6.5	25 7.4	23 8.4																									
SU265-6	78 1.5	70 2.1	63 2.7	56 3.5	51 4.3	48 5.2	50 6.1	41 7.1	39 8.2	36 9.4	34 10.6																									
SU266-6	97 1.8	87 2.5	77 3.3	70 4.2	64 5.2	60 6.3	55 7.4	52 8.6	49 10.0	46 11.4	43 12.8																									
SU267-6			94 3.9	85 5.0	79 6.1	74 7.4	69 8.7	64 10.2	60 11.7	56 13.3	52 15.1																										
SU268-6				100 5.7	92 7.0	86 8.4	80 10.0	75 11.7	70 13.4	65 15.3	60 17.3																											
SU269-6						97 9.5	90 11.3	84 13.2	79 15.2	75 17.3	70 19.6																											
SU2610-6							100 12.6	93 14.7	88 16.9	83 19.3	78 21.8																											
Avg. Tube. Vel. 26"—6-Pass	2.6 ft./ sec.	3.0	3.6	4.1	4.6	5.1	5.6	6.1	6.6	7.1	7.6																									
SU264-4	55	50	46	42	38 1.0	36 1.2	33 1.4	31 1.6	29 1.9	27 2.1	25 2.4	23 2.7	22 3.0	21 3.4	20 3.7	19 4.0		18 4.8		17 5.6																	
SU265-4	70	62	57	52 1.0	48 1.2	44 1.5	41 1.8	39 2.1	36 2.4	34 2.7	33 3.1	30 3.5	24 3.8	28 4.3	26 4.7	25 5.1		23 6.1		22 7.1																	
SU266-4	87	77	70 1.0	65 1.2	59 1.5	55 1.8	52 2.2	49 2.5	46 2.9	43 3.3	41 3.7	38 4.2	36 4.7	35 5.2	33 5.7	32 6.2		29 7.4		27 8.6																	
SU267-4	100	90	83 1.1	78 1.4	71 1.8	66 2.1	62 2.5	58 3.0	55 3.4	52 3.9	49 4.4	46 4.9	44 5.5	41 6.1	40 6.7	38 7.3		35 8.6		33 10.1																	
SU268-4			98 1.3	91 1.7	84 2.0	77 2.5	73 2.9	69 3.4	65 3.9	62 4.5	58 5.0	54 5.6	52 6.3	50 7.0	48 7.7	46 8.4		42 9.9		39 11.6																	
SU269-4					96 2.3	88 2.8	83 3.3	78 3.8	74 4.4	69 5.0	66 5.7	61 6.4	58 7.1	56 7.9	53 8.6	51 9.5		47 11.2		44 13.1																	
SU2610-4						99 3.1	93 3.7	88 4.3	83 4.9	78 5.6	74 6.3	69 7.1	66 7.9	63 8.7	60 9.6	58 10.5		53 12.5		50 14.6																	
Avg. Tube Vel. 26"—4-Pass	1.6 ft./ sec.	1.9	2.3	2.6	2.9	3.2	3.6	3.9	4.2	4.5	4.9	5.2	5.5	5.8	6.1	6.5	6.8	7.1	7.5	7.6																	
SU264-2						27	26	25	24	23	22.5	21	20	19	18.5	18		17		16		15		14 1.0		13 1.2	12 1.3	11 1.5	10.5 1.6	10 1.8	9.5 1.9	9 2.1	8.5 2.3	8 2.5	8 2.7
SU265-2						32	31	29	28	27	26.5	26	25	24	23	22		21		20 1.0		19 1.1		18 1.3		17 1.5	16 1.7	15 1.8	14 2.0	13 2.2	12.5 2.5	12 2.7	11.5 2.9	11 3.1	11 3.4
SU266-2						40	39	37	36	35	34	33	32	30	29	28		26 1.0		25 1.2		24 1.4		22 1.6		21 1.8	20 2.0	19 2.2	18 2.5	17 2.7	16 3.0	15.5 3.2	15 3.5	14.5 3.8	14 4.1
SU267-2						48	47	45	44	42	40	39	38	36	35	34 1.0		32 1.2		31 1.4		29 1.6		27 1.9		26 2.1	24 2.3	23 2.6	22 2.9	21 3.2	20 3.5	19 3.8	18 4.1	17.5 4.5	17 4.8
SU268-2						56	54	51	50	48	46	45	44	42 1.0	40 1.1	39 1.2		37 1.4		35 1.6		33 1.9		31 2.1		30 2.4	28 2.7	27 3.0	26 3.3	24 3.7	23 4.0	22 4.4	21 4.7	20.5 5.1	20 5.5
SU269-2						64	62	58	57	54	53	51	50 1.0	47 1.1	46 1.2	45 1.3		42 1.6		40 1.8		38 2.1		36 2.4		34 2.7	32 3.0	30 3.4	29 3.8	28 4.1	26 4.5	25 4.9	24 5.4	23 5.8	22 6.3
SU2610-2						72	70	66	65	62	60	57 1.0	56 1.1	53 1.2	51 1.3	50 1.5		47 1.7		45 2.0		42 2.4		40 2.7		38 3.0	36 3.4	34 3.8	33 4.2	31 4.6	30 5.0	28 5.5	27 6.0	26 6.5	25 7.0
Avg. Tube Vel. 26"—2-Pass		1.0 ft./ sec.	1.1	1.3	1.4	1.6	1.7	1.9	2.0	2.2	2.4	2.5	2.7	2.8	3.0	3.1	3.3	3.5	3.6	3.8	3.9	4.1	4.3	4.4	4.6	4.7	5.0	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.6	

28" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

"SU" Number	GPM HEATED IN TUBES																																					
	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1500	1600	1700	1800	1900	2000	2200	2400	2600	2800	3000
SU284-6					50 1.2	47 1.6	43 2.0	39 2.5	36 3.0	33 3.5	31 4.1	28 4.8	26 5.4	24 6.1	23 6.9	22 7.6																					
SU285-6					61 1.5	65 2.0	59 2.5	55 3.1	50 3.8	47 4.5	44 5.2	41 6.0	38 6.9	36 7.8	35 8.7	33 9.7																					
SU286-6					92 1.9	83 2.4	74 3.1	68 3.8	64 4.6	59 5.4	55 6.3	51 7.3	48 8.3	46 9.4	44 10.5	42 11.7																					
SU287-6							90 3.6	84 4.5	79 5.4	74 6.4	69 7.4	65 8.6	61 9.8	57 11.0	55 12.4	52 13.8																					
SU288-6									93 6.2	86 7.3	81 8.5	76 9.8	72 11.2	68 12.7	65 14.2	61 15.8																					
SU289-6											92 9.6	86 11.1	81 12.7	76 14.3	74 16.1	71 17.9																					
SU2810-6												96 12.4	91 14.1	86 16.0	82 17.9	79 19.9																					
Ave. Tube Vel. 28"—6-Pass					2.6 ft./ sec.	3.0	3.4	3.9	4.3	4.7	5.1	5.6	6.0	6.4	6.8	7.2																					

28" UNITS CONTINUED NEXT PAGE

HARARAT GOSTAR

28" DIAMETER "SU" CAPACITY TABLE (Continued)

"SU" Number	G.P.M. HEATED IN TUBES																																
	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1300	1400	1500	1600	1700	1800	1900	2000	2200	2400	2600	2800
SU284-4					51	46	43	40	36	34 1.0	32 1.2	33 1.4	29 1.6	27 1.8	25 2.0	24 2.2	22 2.5	21 2.7	19 3.0		17 3.5		15 4.1	14 4.7	13 5.4									
SU285-4					66	58	55	50	46 1.1	44 1.3	40 1.5	39 1.7	37 2.0	34 2.2	33 2.5	31 2.8	29 3.1	28 3.4	27 3.7		24 4.4		22 5.2	20 6.0	19 6.8									
SU286-4					82	73	70	62 1.1	58 1.3	55 1.6	51 1.8	50 2.1	47 2.4	44 2.7	42 3.1	40 3.4	37 3.8	36 4.1	34 4.5		31 5.4		28 6.3	27 7.2	25 8.2									
SU287-4					96	86	83 1.1	76 1.3	71 1.6	67 1.8	62 2.2	61 2.5	57 2.8	53 3.2	51 3.6	48 4.0	45 4.4	43 4.9	41 5.3		38 6.3		35 7.4	33 8.5	31 9.7									
SU288-4							96 1.2	89 1.5	83 1.8	80 2.1	73 2.5	72 2.9	67 3.3	64 3.7	61 4.1	57 4.6	54 5.1	52 5.6	49 6.1		46 7.2		42 8.5	39 9.7	37 11.1									
SU289-4									96 2.0	92 2.4	84 2.8	82 3.2	77 3.7	72 4.1	69 4.7	66 5.2	62 5.7	59 6.3	56 6.9		52 8.2		48 9.5	45 11.0	42 12.5									
SU2810-4											95 3.1	92 3.6	87 4.1	82 4.6	79 5.2	75 5.8	70 6.4	67 7.0	63 7.7		59 9.1		55 10.6	51 12.3	48 14.0									
Avg. Tube Vel. 28"—4-Pass			1.0 ft./ sec.	1.4	1.6	1.9	2.2	2.4	2.7	3.0	3.2	3.5	3.8	4.0	4.3	4.6	4.9	5.1	5.4	5.7	5.9	6.2	6.5	7.0	7.5									
SU284-2											26	24	23	22	21	20.5	20	19	18		17		16	15	14	13	12 1.0	11.5 1.1	11 1.2	10 1.3	9.5 1.4	8.5 1.8	7.5 2.0	6.5 2.3	6 2.6
SU285-2											31	29	28	27	26	25	24.5	24	23		21		20	19	18 1.0	17 1.1	16 1.2	15 1.4	14.5 1.5	14 1.6	13 1.8	12 2.1			
SU286-2											40	37	36	35	34	33	32	31	30		27		26	24 1.0	23 1.2	22 1.3	21 1.5	20 1.6	19 1.8	18 2.0	17 2.2	16 2.6	14 3.0	13 3.5	12 4.0
SU287-2											47	44	43	42	40	39	37	36	35		33		32 1.0	30 1.2	29 1.4	27 1.5	26 1.7	25 1.9	24 2.1	23 2.3	22 2.6	20 3.0	18 3.5	16.5 4.1	15 4.7
SU288-2											55	51	49	48	46	45	43	42	41		38 1.0		37 1.2	35 1.4	34 1.6	32 1.8	30 2.0	29 2.2	27 2.4	26 2.7	25 2.9	23 3.5	21 4.1	19.5 4.7	18 5.4
SU289-2											63	59	57	55	52	51	50	48	47 1.0		44 1.2		43 1.3	40 1.6	39 1.8	36 2.0	34 2.2	33 2.5	32 2.8	30 3.0	29 3.3	27 3.9	24 4.6	22 5.3	20 6.0
SU2810-2											72	67	65	63	60	59	57	54 1.0	53 1.0		50 1.3		48 1.5	45 1.7	43 2.0	41 2.2	39 2.5	37 2.8	36 3.1	35 3.4	33 3.7	30 4.4	27 5.1	25 5.9	23 6.7
Avg. Tube Vel. 28"—2-Pass						1.0 ft./ sec.	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2.0	2.1	2.2	2.3	2.5	2.6	2.7	2.9	3.0	3.1	3.4	3.6	3.9	4.1	4.4	4.7	5.0	5.3	5.8	6.3	6.8	7.4

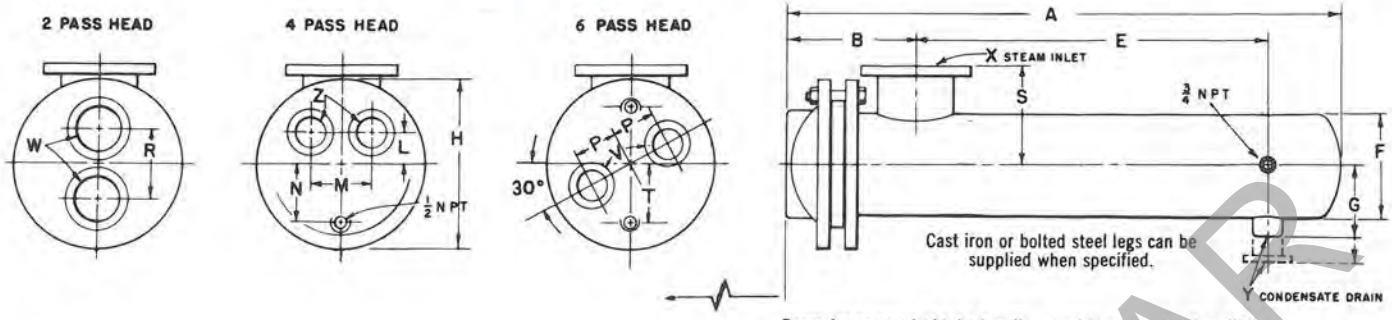
30" DIAMETER "SU" CAPACITY TABLE

Select "SU" by moving down G.P.M. column until temperature factor is reached. Pressure drop in feet is shown in red. P.D. omitted below 1 ft.

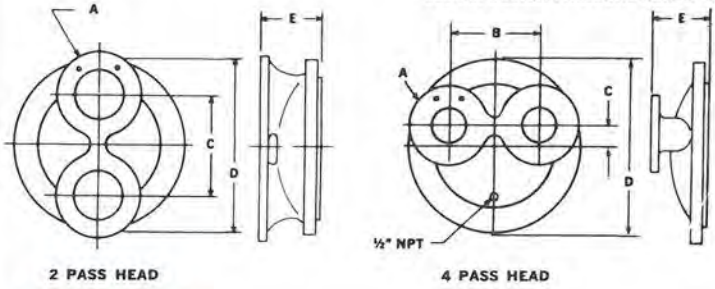
"SU" Number	G.P.M. HEATED IN TUBES																																	
	100	150	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2200	2400	2600	2800	3000	3100
SU304-6					58	54 1.2	48 1.6	44 1.9	41 2.3	38 2.8	34 3.2	32 3.7	31 4.3	29 4.8	27 5.4	25 6.0	24 6.6	22 7.3	21 8.0																
SU305-6					80 1.2	72 1.6	66 2.0	61 2.5	56 3.0	52 3.5	48 4.1	46 4.7	44 5.4	42 6.1	39 6.8	37 7.6	35 8.4	33 9.3	32 10.2														
SU306-6						91 1.9	84 2.4	76 3.0	70 3.6	65 4.3	61 5.0	57 5.7	55 6.5	52 7.4	51 8.3	47 9.2	45 10.2	43 11.2	41 12.3														
SU307-6								93 3.5	87 4.2	81 5.0	76 5.8	72 6.7	69 7.7	65 8.7	63 9.7	59 10.8	56 12.0	53 13.2	50 14.5												
SU308-6										95 5.8	89 6.7	84 7.9	81 8.8	77 10.0	73 11.2	69 12.5	66 13.8	62 15.2	59 16.6												
SU309-6												96 8.7	93 10.0	87 11.3	82 12.6	78 14.1	75 15.6	72 17.1	69 18.7												
SU3010-6														97 12.6	92 14.1	87 15.7	84 17.3	80 19.1	77 21.0												
Avg. Tube Vel. 30"—6-Pass					2.3 ft./ sec.	2.6	3.0	3.4	3.7	4.1	4.5	4.9	5.2	5.6	6.0	6.3	6.7	7.1	7.5														
SU304-4					56	52	47	44	42	38	36 1.0	34 1.1	33 1.3	31 1.4	30 1.6	27 1.8	26 2.0	25 2.2	23 2.4	21 2.8	19 3.3	17 3.8	16 4.3	15 4.9	14 5.4									
SU305-4					73	67	59	56	52	48 1.0	46 1.2	43 1.4	41 1.6	39 1.8	38 2.0	35 2.2	34 2.5	32 2.7	31 3.0	28 3.5	26 4.1	24 4.8	22 5.4	21 6.1	20 6.9									
SU306-4					87	83	74	71	65 1.1	60 1.3	58 1.5	55 1.7	52 1.9	50 2.2	48 2.4	45 2.7	43 3.0	41 3.3	39 3.6	36 4.3	33 5.0	31 5.8	29 6.6	27 7.5	26 8.4									
SU307-4						97	87	84 1.0	78 1.3	73 1.5	70 1.7	67 2.0	63 2.3	60 2.6	58 2.9	54 3.2	52 3.5	50 3.9	47 4.3	43 5.1	40 5.9	37 6.8	35 7.7	33 8.8	32 9.8									
SU308-4								97 1.2	93 1.4	87 1.7	82 2.0	79 2.3	74 2.6	71 2.9	68 3.3	65 3.7	62 4.1	60 4.5	56 4.9	51 5.8	48 6.8	45 7.8	42 8.9	40 10.1	37 11.3								
SU309-4											96 2.2	91 2.6	85 2.9	81 3.3	78 3.7	73 4.2	70 4.6	67 5.1	64 5.5	58 6.6	55 7.6	51 8.8	48 10.1	45 11.4	42 12.7								
SU3010-4													95 3.3	91 3.7	88 4.2	83 4.6	80 5.1	76 5.6	72 6.2	66 7.3	62 8.5	58 9.8	54 11.2	51 12.7	49 14.2								
Avg. Tube Vel. 30"—4-Pass			1.0 ft./ sec.	1.2	1.4	1.6	1.9	2.1	2.4	2.6	2.8	3.0	3.3	3.5	3.7	4.0	4.2	4.4	4.7	5.2	5.6	6.1	6.5	7.0	7.5									
SU304-2												26	25.5	25	24	23	22	21.5	21	20	18	17.5	17	16	15	14	13.5	13		11	10	9	8	7	7
SU305-2												32	31	30	29	28	27	26.5	26	25	23	22	21	20	19 1.0	18 1.1	17 1.2	16.5 1.3		15 1.7	13.5 2.0	12.5 2.3	12 2.6	10 3.0	10 3.1
SU306-2												41	39	38	37	35	34.5	34	33	31	29	28	27	25 1.1	24 1.2	23 1.3	22 1.5	21 1.6		19 2.1	17.5 2.4	16 2.8	14.5 3.2	13.5 3.6	13 3.8
SU307-2												48	46	45	43	42	41	40	38	37	35	34 1.0	33 1.4	31 1.2	30 1.4	28 1.5	27 1.7	26 1.9		23 2.4	21.5 2.8	20 3.3	18 3.7	17 4.2	16.5 4.5
SU308-2												56	54	52	50	48	47	46	44	42	41 1.0	39 1.1	38 1.3	36 1.4	34 1.6	33 1.8	32 2.0	30 2.2		27 2.8	25 3.3	23 3.8	21.5 4.3	20 4.8	19.5 5.1
SU309-2												65	62	60	58	55	53	52	51	48	46 1.1	45 1.2	43 1.4	41 1.6	39 1.8	37 2.0	36 2.2	34 2.4		31 3.2	28.5 3.7	26 4.2	24.5 4.8	23 5.5	22 5.8
SU3010-2												73	70	68	66	63	61	60	58	55 1.0	52 1.2	50 1.4	48 1.6	46 1.8	44 2.0	42 2.2	40 2.5	38 2.7		35 3.5	32 4.1	30 4.2	28 5.4	26 6.1	25 6.5
Avg. Tube Vel. 30"—2-Pass								1.0 ft./ sec.	1.1	1.3	1.4	1.5	1.6	1.7	1.8	2.0	2.1	2.2	2.3	2.5	2.7	3.0	3.2	3.4	3.7	3.9	4.1	4.4	4.6	5.0	5.5	6.0	6.4	6.9	7.1

HARRIS-SEER

TYPE "SU" HEAT EXCHANGERS ("U" Tube Design)



150 PSI DESIGN PRESSURE HEADS Available only on the following units.



2-PASS					4-PASS					
SHELL DIA.	FLG A	C	D	E	SHELL DIA.	FLG A	B	C	D	E
10"	4	9¼	14⅛	5½	10"		NOT AVAILABLE			
12"	4	9¼	16⅝	5	12"		NOT AVAILABLE			
14"	5	10¼	17⅞	6½	14"	4	9¼	2 3/16	17⅞	6⅛
16"	6	11¼	19¾	6¾	16"	4	9½	2⅛	19⅜	6¾
18"	6	11½	22	7¼	18"	4	9½	4½	22	7
20"	8	13¾	24	8	20"	6	11¼	3¼	24	7¾

Flange connections for field piping drilled and faced per 150# ANSI standards.

DIMENSIONS

"SU" type U tube
Shell diameter in inches
Tube length in feet
Number of tube passes

Complete sales number consists of example: SU-86-6

UNIT NUMBER			HEAD DIMENSIONS IN INCHES									DIMENSIONS IN INCHES									HEATING SURFACE SQ. FT.			Approx. Shpg. Wt.
			2 Pass		4 Pass				6 Pass			2, 4 & 6 Pass												
2 Pass	4 Pass	6 Pass	W	R	L	M	N	Z	P	T	V	A	B	E	F	G	H	S	X	Y	2 Pass	4 Pass	6 Pass	(lbs.)
SU42-2	SU42-4		1¼ NPT	2⅜	1	2¼	1¾	1 NPT	—	—	—	29	7	16¼	4½	3¼	7¼	3¼	1¼ NPT	1 NPT	2.5	2.5	—	56
SU43-2	SU43-4		1¼ NPT	2⅜	1	2¼	1¾	1 NPT	—	—	—	41	7	28¼	4½	3¼	7¼	3¼	1¼ NPT	1 NPT	4.1	4.1	—	70
SU44-2	SU44-4	Not	1¼ NPT	2⅜	1	2¼	1¾	1 NPT	—	—	—	53	7	40¼	4½	3¼	7¼	3¼	1¼ NPT	1 NPT	5.7	5.7	—	84
SU45-2	SU45-4	Available	1¼ NPT	2⅜	1	2¼	1¾	1 NPT	—	—	—	65	7	52¼	4½	3¼	7¼	3¼	1¼ NPT	1 NPT	7.2	7.2	—	98
SU46-2	SU46-4		1¼ NPT	2⅜	1	2¼	1¾	1 NPT	—	—	—	77	7	64¼	4½	3¼	7¼	3¼	1½ NPT	1 NPT	8.8	8.8	—	112
SU47-2	SU47-4		1¼ NPT	2⅜	1	2¼	1¾	1 NPT	—	—	—	89	7	76¼	4½	3¼	7¼	3¼	2 NPT	1 NPT	10.4	10.4	—	126
SU62-2	SU62-4	SU62-6	2 NPT	3¼	1 19/32	3 5/16	2 13/16	1½ NPT	2 11/32	2 13/16	1¼ NPT	28⅛	7⅜	15½	6⅜	4⅛	10½	4½	1½ NPT	1 NPT	8.0	8.0	6.0	68
SU63-2	SU63-4	SU63-6	2 NPT	3¼	1 19/32	3 5/16	2 13/16	1½ NPT	2 11/32	2 13/16	1¼ NPT	40⅛	7⅜	27½	6⅜	4⅛	10½	4½	2 NPT	1 NPT	12.7	12.7	9.6	93
SU64-2	SU64-4	SU64-6	2 NPT	3¼	1 19/32	3 5/16	2 13/16	1½ NPT	2 11/32	2 13/16	1¼ NPT	52⅛	7⅜	39½	6⅜	4⅛	10½	4½	2½ NPT	1 NPT	17.4	17.4	13.1	118
SU65-2	SU65-4	SU65-6	2 NPT	3¼	1 19/32	3 5/16	2 13/16	1½ NPT	2 11/32	2 13/16	1¼ NPT	64⅛	7⅜	51½	6⅜	4⅛	10½	4½	2½ NPT	1 NPT	22.1	22.1	16.7	143
SU66-2	SU66-4	SU66-6	2 NPT	3¼	1 19/32	3 5/16	2 13/16	1½ NPT	2 11/32	2 13/16	1¼ NPT	76⅛	7⅜	63½	6⅜	4⅛	10½	4½	3 NPT	1 NPT	26.8	26.8	20.2	168
SU67-2	SU67-4	SU67-6	2 NPT	3¼	1 19/32	3 5/16	2 13/16	1½ NPT	2 11/32	2 13/16	1¼ NPT	88⅛	7⅜	75½	6⅜	4⅛	10½	4½	3 NPT	1 NPT	31.5	31.5	23.8	193
SU68-2	SU68-4	SU68-6	2 NPT	3¼	1 19/32	3 5/16	2 13/16	1½ NPT	2 11/32	2 13/16	1¼ NPT	100⅛	7⅜	87½	6⅜	4⅛	10½	4½	3 NPT	1 NPT	36.2	36.2	27.3	218
SU82-2	SU82-4	SU82-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	29	9⅝	13	8⅝	5⅜	12½	5 5/16	2 NPT	1 NPT	15	15	12	112
SU83-2	SU83-4	SU83-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	41	9⅝	25	8⅝	5⅜	12½	5 5/16	2½ NPT	1 NPT	23	23	19	148
SU84-2	SU84-4	SU84-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	53	9⅝	37	8⅝	5⅜	12½	5 11/16	3 NPT	1 NPT	32	32	26	184
SU85-2	SU85-4	SU85-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	65	9⅝	49	8⅝	5⅜	12½	8¾	4 FLG	1 NPT	41	41	33	220
SU86-2	SU86-4	SU86-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	77	9⅝	61	8⅝	5⅜	12½	8¾	4 FLG	1¼ NPT	49	49	41	256
SU87-2	SU87-4	SU87-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	89	9⅝	73	8⅝	5⅜	12½	8¾	4 FLG	1¼ NPT	58	58	48	292
SU88-2	SU88-4	SU88-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	101	9⅝	85	8⅝	5⅜	12½	8¾	6 FLG	1¼ NPT	67	67	55	328
SU89-2	SU89-4	SU89-6	3 NPT	5	2	4	3½	2 NPT	3	3¼	2 NPT	113	9⅝	97	8⅝	5⅜	12½	8¾	6 FLG	1¼ NPT	75	75	62	364

Dimensions are subject to change. If exact dimension are needed for layout, write for certified prints.

(continued next page)

REPRINT GOSTAR

TYPE "SU" HEAT EXCHANGERS ("U" Tube Design)

DIMENSIONS (continued)

"SU" type U tube
Shell diameter in inches
Tube length in feet
Number of tube passes

Complete sales number consists of example: SU-86-6

UNIT NUMBER			HEAD DIMENSIONS IN INCHES									DIMENSIONS IN INCHES									HEATING SURFACE SQ. FT.			Approx. Shpg. Wt.
			2 Pass		4 Pass				6 Pass			2, 4—6 Pass, 4' thru 12' only												
2 Pass	4 Pass	6 Pass	W	R	L	M	N	Z	P	T	V	A	B	E	F	G	H	S	X	Y	2 Pass	4 Pass	6 Pass	(lbs.)
SU102-2	SU102-4	SU102-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	29	10	11¾	10¾	6½	14⅜	6¾	3 NPT	1 NPT	27	25	21	184
SU103-2	SU103-4	SU103-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	41	10	23¾	10¾	6½	14⅜	9⅜	4 FLG	1 NPT	42	39	33	230
SU104-2	SU104-4	SU104-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	53	10	35¾	10¾	6½	14⅜	9⅜	4 FLG	1¼ NPT	56	53	45	276
SU105-2	SU105-4	SU105-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	65	10	47¾	10¾	6½	14⅜	9⅜	6 FLG	1¼ NPT	71	68	56	322
SU106-2	SU106-4	SU106-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	77	10	59¾	10¾	6½	14⅜	9⅜	6 FLG	1½ NPT	86	82	68	368
SU107-2	SU107-4	SU107-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ PNT	89	10	71¾	10¾	6½	14⅜	9⅜	6 FLG	1½ NPT	101	96	80	414
SU108-2	SU108-4	SU108-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	101	10	83¾	10¾	6½	14⅜	9⅜	6 FLG	2 NPT	116	110	92	460
SU109-2	SU109-4	SU109-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	113	10	95¾	10¾	6½	14⅜	9⅜	6 FLG	2 NPT	131	124	104	506
SU1010-2	SU1010-4	SU1010-6	4 NPT	5⅞	2⅜	4¾	4⅞	3 NPT	3 13/16	4⅞	2½ NPT	125	10	107¾	10¾	6½	14⅜	9⅜	6 FLG	2 NPT	146	138	116	552
SU123-2	SU123-4	SU123-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	41½	12	21½	12¾	7¾	16⅜	10⅞	4 FLG	1¼ NPT	61	58	50	294
SU124-2	SU124-4	SU124-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	53½	12	33½	12¾	7¾	16⅜	10⅞	6 FLG	1¼ NPT	83	78	68	363
SU125-2	SU125-4	SU125-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	65½	12	45½	12¾	7¾	16⅜	10⅞	6 FLG	1½ NPT	104	98	85	432
SU126-2	SU126-4	SU126-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	77½	12	57½	12¾	7¾	16⅜	10⅞	6 FLG	2 NPT	126	119	103	501
SU127-2	SU127-4	SU127-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	89½	12	69½	12¾	7¾	16⅜	10⅞	8 FLG	2 NPT	147	139	121	570
SU128-2	SU128-4	SU128-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	101½	12	81½	12¾	7¾	16⅜	10⅞	8 FLG	2 NPT	169	160	139	639
SU129-2	SU129-4	SU129-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	113½	12	93½	12¾	7¾	16⅜	10⅞	8 FLG	2½ NPT	191	180	156	708
SU1210-2	SU1210-4	SU1210-6	4 NPT	7¼	2⅜	5⅜	5⅞	4 NPT	4½	5 13/16	3 NPT	125½	12	105½	12¾	7¾	16⅜	10⅞	8 FLG	2½ NPT	212	200	174	777
SU143-2	SU143-4	SU143-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	44¾	15⅜	21¾	14	8⅜	17⅞	11½	6 FLG	1¼ NPT	86	83	72	449
SU144-2	SU144-4	SU144-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	56¾	15⅜	33¾	14	8⅜	17⅞	11½	6 FLG	2 NPT	116	111	97	534
SU145-2	SU145-4	SU145-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	68¾	15⅜	45¾	14	8⅜	17⅞	11½	6 FLG	2 NPT	146	139	122	619
SU146-2	SU146-4	SU146-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	80¾	15⅜	57¾	14	8⅜	17⅞	11½	8 FLG	2 NPT	175	167	147	704
SU147-2	SU147-4	SU147-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	92¾	15⅜	69¾	14	8⅜	17⅞	11½	8 FLG	2½ NPT	204	196	171	789
SU148-2	SU148-4	SU148-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	104¾	15⅜	81¾	14	8⅜	17⅞	11½	8 FLG	2½ NPT	234	224	196	874
SU149-2	SU149-4	SU149-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	116¾	15⅜	93¾	14	8⅜	17⅞	11½	10 FLG	2½ NPT	263	252	221	959
SU1410-2	SU1410-4	SU1410-6	6 NPT	8	3 5/16	5⅜	6 5/16	4 NPT	—	—	3 FLG	128¾	15⅜	105¾	14	8⅜	17⅞	11½	10 FLG	3 NPT	292	280	246	1044
SU163-2	SU163-4	SU163-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	45⅝	16½	21	16	9½	19⅞	12½	6 FLG	1½ NPT	112	106	96	570
SU164-2	SU164-4	SU164-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	57⅝	16½	33	16	9½	19⅞	12½	6 FLG	2 NPT	150	143	129	675
SU165-2	SU165-4	SU165-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	69⅝	16½	45	16	9½	19⅞	12½	8 FLG	2½ NPT	188	180	162	780
SU166-2	SU166-4	SU166-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	81⅝	16½	57	16	9½	19⅞	12½	8 FLG	2½ NPT	227	217	195	885
SU167-2	SU167-4	SU167-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	93⅝	16½	69	16	9½	19⅞	12½	10 FLG	2½ NPT	265	254	228	990
SU168-2	SU168-4	SU168-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	105⅝	16½	81	16	9½	19⅞	12½	10 FLG	3 NPT	304	291	261	1095
SU169-2	SU169-4	SU169-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	117⅝	16½	93	16	9½	19⅞	12½	10 FLG	3 NPT	342	327	294	1200
SU1610-2	SU1610-4	SU1610-6	6 NPT	9⅛	4	8	7 1/16	4 NPT	—	—	4 FLG	129⅝	16½	105	16	9½	19⅞	12½	10 FLG	3 NPT	380	363	327	1305
SU183-2	SU183-4	SU183-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	48½	17¾	21½	18	10½	22	13½	6 FLG	2 NPT	148	148	136	712
SU184-2	SU184-2	SU184-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	60½	17¾	33½	18	10½	22	13½	8 FLG	2 NPT	195	195	179	836
SU185-2	SU185-4	SU185-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	72½	17¾	45½	18	10½	22	13½	8 FLG	2½ NPT	242	242	223	960
SU186-2	SU186-4	SU186-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	84½	17¾	57½	18	10½	22	13½	10 FLG	3 NPT	290	290	266	1084
SU187-2	SU187-4	SU187-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	96½	17¾	69½	18	10½	22	13½	10 FLG	3 NPT	339	339	309	1208
SU188-2	SU188-4	SU188-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	108½	17¾	81½	18	10½	22	13½	10 FLG	3 NPT	387	387	352	1332
SU189-2	SU189-4	SU189-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	120½	17¾	93½	18	10½	22	13½	12 FLG	3 NPT	435	435	395	1456
SU1810-2	SU1810-4	SU1810-6	6 NPT	11	4⅝	9¼	8⅜	4 NPT	—	—	4 FLG	132½	17¾	105½	18	13½	22	13½	12 FLG	4 FLG	483	483	439	1580
SU203-2	SU203-4	SU203-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	49¾	21	19	20	11½	24	14½	8 FLG	2 NPT	194	188	182	1001
SU204-2	SU204-4	SU204-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	61¾	21	31	20	11½	24	14½	8 FLG	2½ NPT	259	251	240	1158
SU205-2	SU205-4	SU205-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	73¾	21	43	20	11½	24	14½	10 FLG	3 NPT	324	314	298	1315
SU206-2	SU206-4	SU206-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	85¾	21	55	20	11½	24	14½	10 FLG	3 NPT	388	377	355	1472
SU207-2	SU207-4	SU207-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	97¾	21	67	20	11½	24	14½	12 FLG	3 NPT	453	439	413	1629
SU208-2	SU208-4	SU208-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	109¾	21	79	20	14½	24	14½	12 FLG	4 FLG	517	502	471	1786
SU209-2	SU209-4	SU209-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	121¾	21	91	20	14½	24	14½	12 FLG	4 FLG	582	565	528	1943
SU2010-2	SU2010-4	SU2010-6	8 NPT	10⅝	4⅜	8¾	9½	6 NPT	—	—	5 FLG	133¾	21	103	20	14½	24	14½	14 FLG	4 FLG	647	628	586	2100

Dimensions are subject to change. If exact dimensions are needed for layout, write for certified prints.

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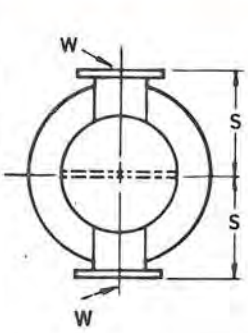
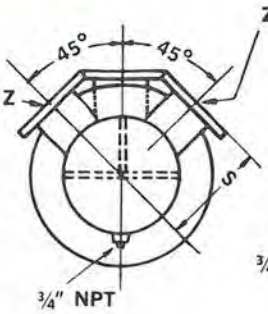
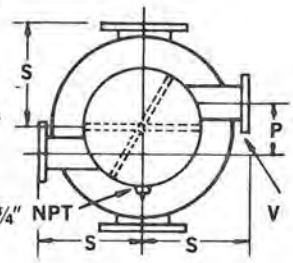
TYPE "SU" HEAT EXCHANGERS ("U" Tube Design)
DIMENSIONS (Continued)



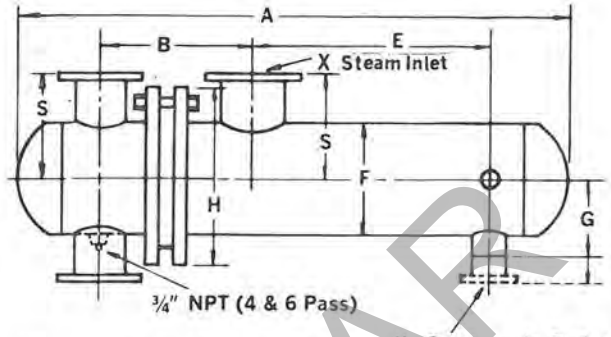
2 PASS HEAD



4 PASS HEAD



6 PASS HEAD



Flange connections for field piping drilled and faced per 150# ANSI standards.

UNIT NUMBER			DIMENSION IN INCHES																	HEATING SURFACE SQ. FT.			Approx. Shpg. Wt.
			2 Pass			4 Pass			6 Pass				2, 4 & 6 Pass										
2 Pass	4 Pass	6 Pass	A	B	W FLG	A	B	E FLG	A	B	P	V FLG	E	F	G	H	S	X FLG	Y	2 Pass	4 Pass	6 Pass	(lbs.)
SU223-2	SU223-4	SU223-6	69⅜	19⅛	10	63 13/16	17⅜	6	62⅜	16⅞	11	5	23⅛	22	13	26⅛	15½	8	2½ NPT	255	249	228	1212
SU224-2	SU224-4	SU224-6	81⅜	21⅛	10	75 13/16	18⅜	6	76⅜	18⅛	11	5	36⅛	22	13	26⅛	15½	10	3 NPT	333	325	298	1396
SU225-2	SU225-4	SU225-6	93⅜	21⅛	10	87 13/16	18⅜	6	86⅜	18⅛	11	5	46⅛	22	13	26⅛	15½	10	3 NPT	411	401	369	1580
SU226-2	SU226-4	SU226-6	105⅜	22⅜	10	99 13/16	20⅛	6	98⅜	19⅜	11	5	56⅜	22	15½	26⅛	15½	12	4 FLG	489	477	438	1764
SU227-2	SU227-4	SU227-6	117⅜	22⅜	10	111 13/16	20⅛	6	110⅜	19⅜	11	5	68⅜	22	15½	26⅛	15½	12	4 FLG	568	554	508	1948
SU228-2	SU228-4	SU228-6	129⅜	23⅜	10	123 13/16	21⅛	6	122⅜	20⅜	11	5	79⅜	22	15½	26⅛	15½	14	4 FLG	645	630	578	2132
SU229-2	SU229-4	SU229-6	141⅜	23⅜	10	135 13/16	21⅛	6	136⅜	20⅜	11	5	91⅜	22	15½	26⅛	15½	14	4 FLG	724	706	647	2316
SU2210-2	SU2210-4	SU2210-6	153⅜	24⅜	10	147 13/16	22⅜	6	146⅜	21⅜	11	5	101 1/16	22	15½	26⅛	15½	16	6 FLG	803	782	718	2500
SU244-2	SU244-4	SU244-6	82⅜	21⅛	10	79 13/16	20⅛	8	77 9/16	19⅜	12	6	33⅛	24	14	28⅛	16½	10	3 NPT	394	385	370	1710
SU245-2	SU245-4	SU245-6	96⅛	23⅜	10	91 13/16	22⅛	8	89 9/16	20⅞	12	6	43⅞	24	16½	28⅛	16½	12	4 FLG	490	479	457	1928
SU246-2	SU246-4	SU246-6	106⅜	23⅜	10	103 13/16	22⅛	8	101 9/16	20⅞	12	6	55⅞	24	16½	28⅛	16½	12	4 FLG	586	572	545	2146
SU247-2	SU247-4	SU247-6	118⅜	24⅜	10	115 13/16	23⅛	8	113 9/16	21⅞	12	6	66⅞	24	16½	28⅛	16½	14	4 FLG	681	666	632	2364
SU248-2	SU248-4	SU248-6	130⅜	25⅜	10	127 13/16	24⅜	8	125 9/16	23⅛	12	6	75⅜	24	16½	28⅛	16½	16	6 FLG	777	759	719	2582
SU249-2	SU249-4	SU249-6	142⅜	25⅜	10	139 13/16	24⅜	8	137 9/16	23⅛	12	6	87 9/16	24	16½	28⅛	16½	16	6 FLG	873	853	806	2800
SU2410-2	SU2410-4	SU2410-6	154⅜	25⅜	10	151 13/16	24⅜	8	149 9/16	23⅛	12	6	99 9/16	24	16½	28⅛	16½	16	6 FLG	969	946	893	3018
SU264-2	SU264-4	SU264-6	88¼	25½	12	82 13/16	22¾	8	79 15/16	21½	12	6	32⅝	26	15	30⅜	17½	12	3 NPT	488	476	447	2036
SU265-2	SU265-4	SU265-6	100¼	25½	12	94 1/16	22¾	8	91 15/16	21½	12	6	44⅝	26	17½	30⅜	17½	12	4 FLG	600	585	549	2280
SU266-2	SU266-4	SU266-6	112¼	26½	12	106 1/16	23¾	8	103 15/16	22½	12	6	55⅝	26	17½	30⅜	17½	14	4 FLG	712	694	651	2524
SU267-2	SU267-4	SU267-6	124¼	27¾	12	118 3/16	25	8	115 15/16	23¾	12	6	64 5/16	26	17½	30⅜	17½	16	6 FLG	823	803	754	2768
SU268-2	SU268-4	SU268-6	136¼	27¾	12	130 1/16	25	8	127 15/16	23¾	12	6	76 5/16	26	17½	30⅜	17½	16	6 FLG	935	912	856	3012
SU269-2	SU269-4	SU269-6	148¼	28½	12	142 3/16	25¾	8	139 15/16	24½	12	6	87 9/16	26	17½	30⅜	17½	18	6 FLG	1047	1021	959	3256
SU2610-2	SU2610-4	SU2610-6	160¼	28½	12	154 3/16	25¾	8	151 15/16	24½	12	6	99 9/16	26	17½	30⅜	17½	18	6 FLG	1159	1130	1061	3500
SU284-2	SU284-4	SU284-6	78¾	25⅜	12	75⅜	24⅛	10	70 1/16	21⅜	12	6	20⅝	28	18½	32⅝	18½	12	4 FLG	456	447	420	2502
SU285-2	SU285-4	SU285-6	90⅜	26⅜	12	87⅜	25⅛	10	82 1/16	22⅜	12	6	31⅝	28	18½	32⅝	18½	14	4 FLG	587	575	540	2785
SU286-2	SU286-4	SU286-6	102⅜	27⅜	12	99⅜	26⅜	10	94 1/16	23⅜	12	6	41 5/16	28	18½	32⅝	18½	16	6 FLG	717	703	661	3068
SU287-2	SU287-4	SU287-6	114⅜	27⅜	12	111⅜	26⅜	10	106 1/16	23⅜	12	6	53 1/16	28	18½	32⅝	18½	16	6 FLG	848	831	781	3351
SU288-2	SU288-4	SU288-6	126⅜	28⅜	12	123⅜	27⅛	10	118 1/16	24⅜	12	6	64¼	28	18½	32⅝	18½	18	6 FLG	978	959	901	3634
SU289-2	SU289-4	SU289-6	138⅜	28⅜	12	135⅜	27⅛	10	130 1/16	24⅜	12	6	76 9/16	28	18½	32⅝	18½	18	6 FLG	1110	1088	1022	3917
SU2810-2	SU2810-4	SU2810-6	150⅜	29⅜	12	147⅜	28⅛	10	142 1/16	25⅜	12	6	87 5/16	28	18½	32⅝	18½	20	6 FLG	1240	1216	1142	4200
SU304-2	SU304-4	SU304-6	82⅞	26⅛	14	77¾	24⅜	10	74 11/16	23⅛	14½	8	21½	30	19½	34⅝	19½	12	4 FLG	539	529	499	2886
SU305-2	SU305-4	SU305-6	94⅞	29⅛	14	89¾	26⅝	10	86 11/16	25⅛	14½	8	31¼	30	19½	34⅝	19½	16	4 FLG	690	676	639	3205
SU306-2	SU306-4	SU306-6	106⅞	29⅛	14	101¾	26⅝	10	98 11/16	25⅛	14½	8	41 5/16	30	19½	34⅝	19½	16	6 FLG	840	822	778	3524
SU307-2	SU307-4	SU307-6	118⅞	29⅛	14	113¾	27⅛	10	110 11/16	26⅛	14½	8	53 1/16	30	19½	34⅝	19½	18	6 FLG	991	970	917	3843
SU308-2	SU308-4	SU308-6	130⅞	29⅞	14	125¾	27⅞	10	122 11/16	26⅛	14½	8	65 1/16	30	19½	34⅝	19½	18	6 FLG	1139	1116	1056	4162
SU309-2	SU309-4	SU309-6	142⅞	31⅛	14	137¾	28⅝	10	134 11/16	27⅞	14½	8	75 15/16	30	19½	34⅝	19½	20	6 FLG	1289	1264	1195	4481
SU3010-2	SU3010-4	SU3010-6	154⅞	31⅛	14	149¾	28⅝	10	146 11/16	27⅞	14½	8	87 15/16	30	19½	34⅝	19½	20	6 FLG	1439	1410	1333	4800

Dimensions are subject to change. If exact dimensions are needed for layout, write for certified prints.

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TYPE "SU" WATER HEATERS

As a Convertor

1. The "SU" Convertors are widely used for comfort heating of Apartment Buildings, Hotels, Hospitals, Schools, Industrial and Process Plants and Office Buildings.
2. High Rise Buildings utilize the "SU" to withstand high static pressures so that low pressure steam boilers can be used instead of costly high pressure boilers.
3. An "SU" heater can be controlled to produce the relatively low temperatures required for radiant panel heating systems. In industrial plants where steam boilers are used for process work, this affords an opportunity to provide the most comfortable type of heating for the building.
4. Snow melting panels are widely used to eliminate labor and dangerous conditions. Sidewalks and driveways are easily kept clear of snow and ice by means of antifreeze solutions circulated through pipe coils imbedded in concrete.

As an Instantaneous Water Heater

1. The "SU" Heater provides an efficient, low cost method of heating faucet water for Apartment Buildings, Hotels, Hospitals, Schools and Industrial Plants. Comparatively small units produce large volumes of hot water, when a proper steam control valve is used.
2. When sufficient steam is not available to instantaneously heat water, or when large capacities are required for short intervals, the "SU" may be used in conjunction with a storage tank.
3. †The "SU" also may be used as a swimming pool heater. Normally, the smallest unit that can handle the flow rate of the filter pump will adequately heat pool water.

TYPICAL INSTALLATIONS

As a Convertor

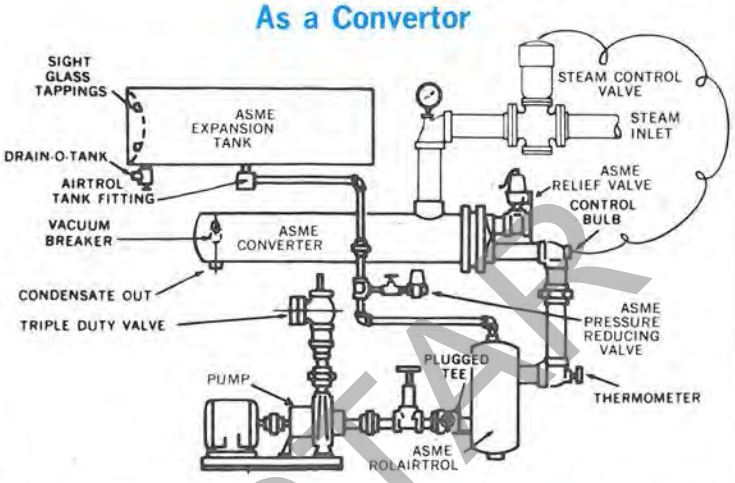

Figure 1—Typical installation of "SU" Heat Exchanger when used as a Convertor.

As an Instantaneous Water Heater

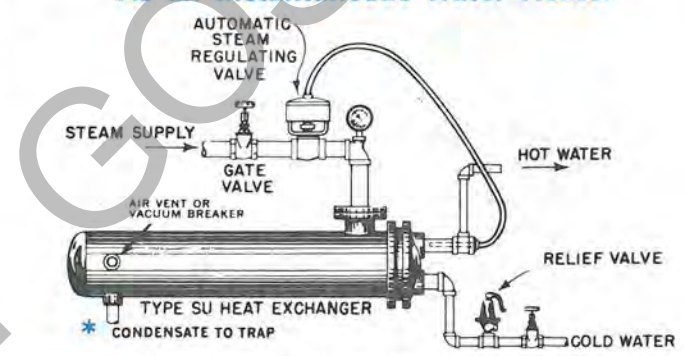

Figure 2—Typical installation of "SU" Heat Exchanger when used as an Instantaneous Heater.

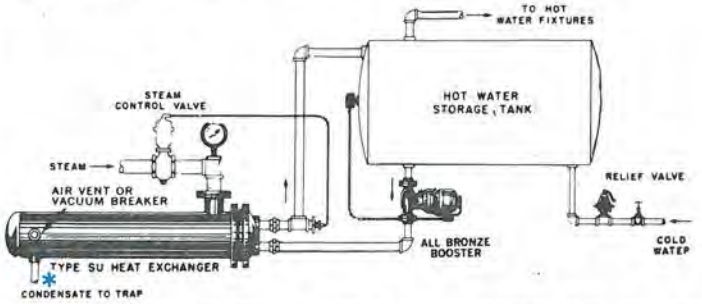

Figure 3—Typical installation of "SU" Heat Exchanger when used with storage tank.

*** CAUTION:**

Steam hammer can cause serious damage to the tubes of any Heat Exchanger. A careful consideration of the following points before an installation is made can prevent costly repairs which may be caused by steam hammer.

1. A vacuum breaker and/or vent, should be used in accordance with the type of steam system installed.
2. The proper trap for the steam system installed should be used.
3. The trap and the condensate return line to the trap should be properly sized for the total capacity of the convertor.
4. The trap should be sized for the differential pressure across the trap, not the inlet pressure to the steam controller.
5. A properly sized relief valve must be installed on the heated water side to protect heat exchangers from possible damage due to volumetric expansion.

†Swimming Pool water may be corrosive to copper. 90/10 Cupro-Nickel is available on special order.

HARARAT GOSTAR

TYPICAL SPECIFICATIONS

Furnish and install approximately where shown on plans and with manufacturer's recommendations. Heat exchangers according to the following specifications:

1. CAPACITY

a. To heat_____GPM from_____°F. to_____°F. with_____PSIG steam
b. Maximum tube velocity of 7.5′ per second.
c. Maximum water pressure drop___feet.
d. Minimum scale factor_____.
e. Minimum shell diameter_____inches.
f. Maximum length_____feet.
g. Minimum tube surface_____sq. ft.

2. TYPE

Shell and tube, U-bend removable tube bundle, steam in shell, water in tubes. Equipped with mounting legs.

3. MATERIALS

a. Shell—steel.
b. Tubes $\frac{3}{4}$" or $\frac{7}{8}$" OD copper.
c. Heads—cast iron or steel.
d. Tube sheets—steel.
e. Tube supports—steel.

4. CONSTRUCTION*

A manufacturers' data report for pressure vessels, form No. U-1 as required by the provisions of the ASME Code Rules, is to be furnished to the engineer for the owner upon request. This form must be signed by an authorized inspector, holding a National Board commission, certifying that construction conforms to the latest ASME Code for pressure vessels for:

Shell side _____PSIG design pressure at _____°F.
Tube side _____PSIG design pressure at _____°F.

as detailed in form No. U-1. The ASME "U" symbol should also be stamped on the Heat Exchanger. In addition, each unit is registered with the National Board of Boiler and Pressure Vessel Inspectors.

5. INSTALLATION

a. The steam supply line shall be adequately sized and equipped with a_____inch steam control valve.
The steam control valve shall be actuated by a thermal control element in the hot water line from the Exchanger adjusted and set to maintain a temperature of_____°F. in the water leaving the Exchanger.
b. Exchanger shall have adequate condensate return line equipped with proper trap for steam system.
c. Exchanger shall be equipped with proper vacuum breaker and/or vent as required.

6. MANUFACTURERS

a. Exchangers shall be as manufactured by HARARAT GOSTAR IND. & MFG. CO. ____
b. Steam control valve shall be as manufactured by _____
c. Vacuum breaker shall be as manufactured by _____
d. Trap shall be as manufactured by _____
e. Vent shall be as manufactured by _____

HARARAT GOSTAR

HEAD AND PRESSURE EQUIVALENTS

FEET HEAD OF WATER AND EQUIVALENT PRESSURES

Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.	Feet Head	Pounds per Sq. In.
1	.43	30	12.99	140	60.63	300	129.93
2	.87	40	17.32	150	64.96	325	140.75
3	1.30	50	21.65	160	69.29	350	151.58
4	1.73	60	25.99	170	73.63	400	173.24
5	2.17	70	30.32	180	77.96	500	216.55
6	2.60	80	34.65	190	82.29	600	259.85
7	3.03	90	38.98	200	86.62	700	303.16
8	3.46	100	43.31	225	97.45	800	346.47
9	3.90	110	47.64	250	108.27	900	389.78
10	4.33	120	51.97	275	119.10	1000	433.09
20	8.66	130	56.30				

PRESSURES AND EQUIVALENT FEET HEAD OF WATER

Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head	Lbs. per Sq. In.	Feet Head
1	2.31	20	46.18	120	277.07	225	519.51
2	4.62	25	57.72	125	288.62	250	577.24
3	6.93	30	69.27	130	300.16	275	643.03
4	9.24	40	92.36	140	323.25	300	692.69
5	11.54	50	115.45	150	346.34	325	750.41
6	13.85	60	138.54	160	369.43	350	808.13
7	16.16	70	161.63	170	392.52	375	865.89
8	18.47	80	184.72	180	415.61	400	922.58
9	20.78	90	207.81	190	438.90	500	1154.48
10	23.09	100	230.90	200	461.78	1000	2309.00
15	34.63	110	253.98				

CONVERSION FACTORS

TO CONVERT FROM	TO	MULTIPLY BY
	Pressure	
Atmospheres	ft. of water	33.9
Atmospheres	mm. of mercury	760.0
Atmospheres	pounds sq. in.	14.696
Feet of water (40°F)	pounds/sq. in.	0.4335
Inches of mercury (32°F)	feet of water (40°F)	1.133
Inches of mercury (32°F)	pounds/sq. in.	0.49116
Inches of water (40°F)	pounds sq. in.	0.03614
mm. of mercury (32°F)	pounds/sq. in.	0.01934
Pounds sq. in.	feet of water (40°F)	2.3066
Pounds sq. in.	inches of mercury (32°F)	2.036
	Volume	
Barrels (oil)	gallons	42.0
Barrels (breweries)	gallons	31.0
Cubic cm	cubic inches	0.061023
Cubic ft	cubic inches	1728.0
Cubic ft	cubic meters	0.02832
Cubic ft	gallons	7.481
Cubic meters	gallons	264.17
Gallons	cubic ft.	0.1337
Gallons	cubic inches	231.0
Gallons	gallons (British)	0.83268
Gallons	liters	3.7853
Liters	gallons	0.2642
Liters	quarts	1.0567
	Heat	
Boiler horsepower (BHP)	BTU/hr	33479.0
BTU	calories (gram)	252.0
BTU	calories (kg.)	0.252
Calories (gram)/gram/°C	BTU/pound/°F	1.0
Calories (gram) per gram	BTU/pound	1.8
Horsepower	BTU/hr	2545.0
K. W. hours	BTU	3413.0

TO CONVERT FROM	TO	MULTIPLY BY
	Temperature	
Centigrade degrees	Fahrenheit degrees	1.8 and add 32°
Fahrenheit degrees	Centigrade degrees	Subtract 32° and multiply by 0.5555
	Measure	
Centimeters	inches	0.3937
Feet	meters	0.3048
Inches	centimeters	2.54
Kilometers	miles	0.6214
Meters	feet	3.2808
Microns	millimeters	0.001
Sq. meters	sq. feet	10.764
	Weight	
Cubic ft. of water (60°F)	pounds	62.37
Gallons	pounds of water (60°F)	8.34
Grains	pounds	1/7000
Grains/gal	parts per million	17.12
Grams	grains	15.43
Kilograms	pounds	2.2046
Pounds	grams	453.59
Pounds	kilograms	0.4536
Tons (long)	tons (short)	1.12
	Volumetric Rate	
Cubic ft./sec	gallons/min	448.83
Gallons/min	cu. ft./sec.	0.00223
	Power	
Horsepower	ft. lbs./sec.	550.0
Horsepower	K.W.	0.745
	Viscosity	
Centipoises	lbs./sec./ft.	0.000672
Poises	centipoises	0.01
	Velocity	
Ft./sec.	meters/sec	0.3048
Meters/sec	ft./sec.	3.2808

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MFG. & ENG. CO.