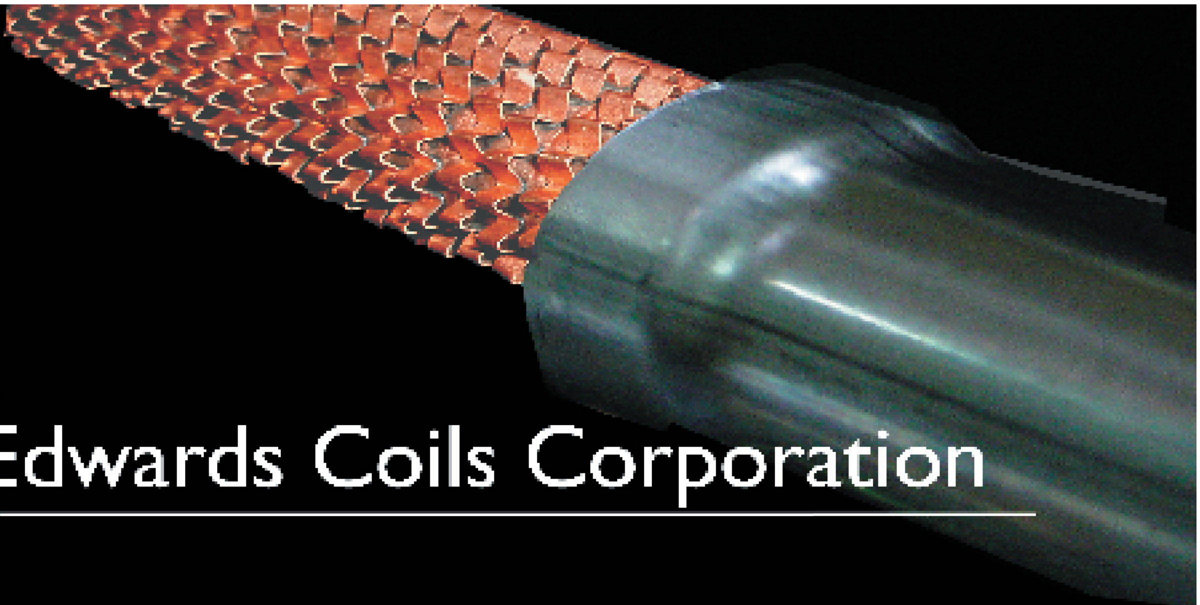
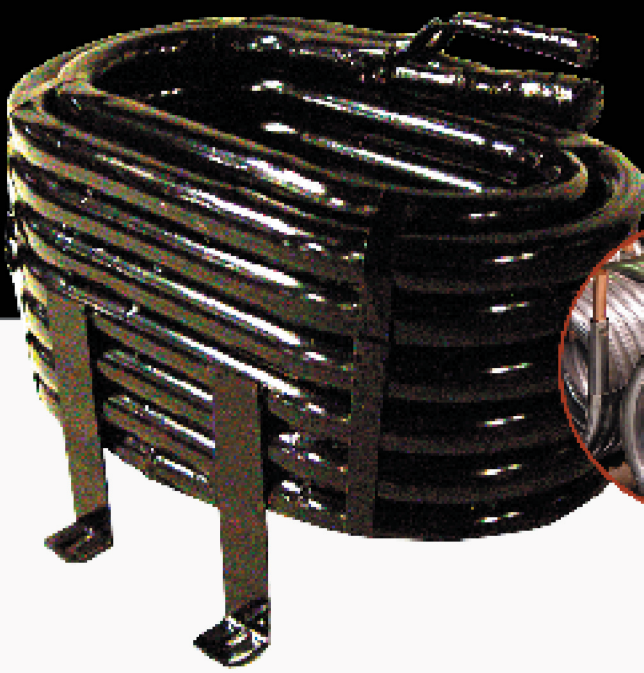
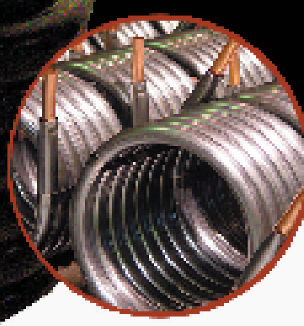


Edwards Coils Corporation

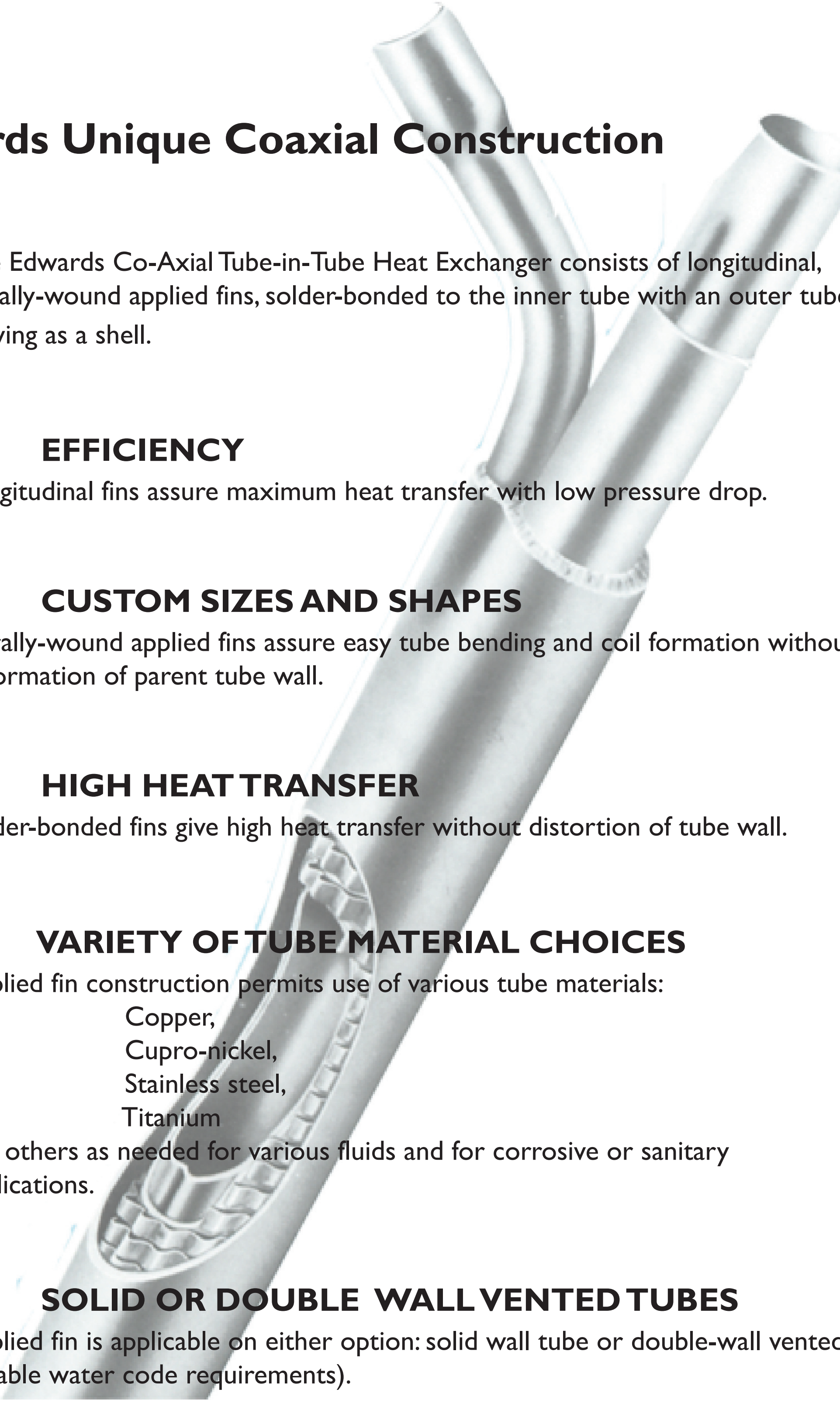




Coaxial Enhanced Fin Heat Exchangers

- Condensers • Evaporators • Desuperheaters
- Heat Pumps, including ground water designs
- Potable water applications

Edwards Unique Coaxial Construction



The Edwards Co-Axial Tube-in-Tube Heat Exchanger consists of longitudinal, spirally-wound applied fins, solder-bonded to the inner tube with an outer tube serving as a shell.

EFFICIENCY

Longitudinal fins assure maximum heat transfer with low pressure drop.

CUSTOM SIZES AND SHAPES

Spirally-wound applied fins assure easy tube bending and coil formation without deformation of parent tube wall.

HIGH HEAT TRANSFER

Solder-bonded fins give high heat transfer without distortion of tube wall.

VARIETY OF TUBE MATERIAL CHOICES

Applied fin construction permits use of various tube materials:

Copper,
Cupro-nickel,
Stainless steel,
Titanium

and others as needed for various fluids and for corrosive or sanitary applications.

SOLID OR DOUBLE WALL VENTED TUBES

Applied fin is applicable on either option: solid wall tube or double-wall vented tube (for potable water code requirements).

Cut water consumption

When used as a refrigerant condenser, the Edwards coaxial counter-flow heat exchanger reduces the consumption of condenser cooling water dramatically because the desuperheating of the refrigerant gas can be performed by the condenser water (in counter-flow the refrigerant) after the refrigerant has been sub-cooled and condensed. With hermetic compressors, this feature is of particular importance since at least 35% of the heat rejection in the condenser is in the superheat region. It is even possible to have the water leave the condenser at a temperature higher than the condensing temperature.

Material flexibility

Applied fin construction permits use of various materials for a wide range of applications: copper, cupro-nickel, stainless steel, and titanium.

Reduce refrigerant charge

Edwards condensers have maximized the available surface area between tubes. This decreases the internal volume of the annulus and thereby the amount of refrigerant required for operation. The smooth bore inner tube with uniform wall provides capacity at lower weight (pounds) per coil.

Low maintenance

Edwards water cooled refrigerant condensers are designed for long life and low cost. They are the most effective heat transfer units available. The smooth bore tube is less prone than an ordinary coaxial heat exchanger to dirt build-up, resulting in longer intervals between regularly scheduled maintenance.

Stabilize capillary Performance

Capillary tubing works best over a wide range of temperatures when operated with tube-in-tube condensers having a low internal refrigerant volume. If the condenser water drops in temperature the head pressure will drop and reduce the pressure available to force the refrigerant through the capillary. With Edwards coaxial condensers the condensing surface at low water temperatures will become flooded with refrigerant and thus reduce the condenser capacity.

Single-wall and double-wall vented

The Advanced Fin line is designed to accommodate single-wall and double wall vented applications, allowing monitoring of the inner tube for potable water applications.

Save space

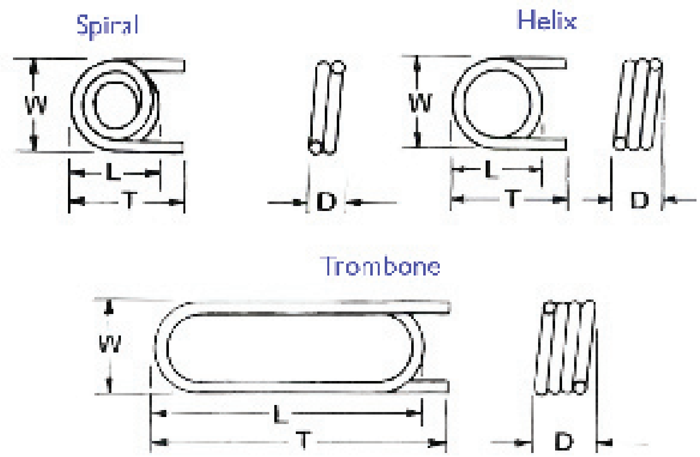
The unique method of finning developed by Edwards Coils Corp. places more finned surface area in the annulus than any other condenser coil. This increase in internal surface area maximizes heat transfer and allows the use of shorter coil lengths which result in more compact configurations.

Sea water construction

For marine, seawater, or brackish water conditions, all models are available with inner tubes of 90/10 cupro-nickel, titanium and other metals.

Custom designs are always available

The Edwards Coils Heat Exchangers can be made in many different shapes to fit your needs. Our three most common are shown below, the spiral, trombone, and helix. However if you require a different shape, our large stock of bending jigs will solve your space problems.



Our standard models are available in capacities ranging from 1/2 to 10 tons.

MODEL	BODY SHAPE	COAXIAL TUBE DESIGN	COPPER TUBING CONNECTIONS				DIMENSIONS				
			REFRIGERANT		WATER						
			TUBE SIZE	WALL	TUBE SIZE	WALL	OVERALL LENGTH	BODY LENGTH	HEIGHT	WIDTH	APPROX. WATER TUBE LENGTH
B-1/2	Trombone	C407	3/8”ID	.028	1/2”OD	.025	17”	16”	1 3/4”	7 1/4”	6’6”
B-3/4	Trombone	C407	3/8”ID	.028	1/2”OD	.025	17”	16”	2 5/8”	7 1/4”	9’5”
B-1	Trombone	C407	3/8”ID	.028	1/2”OD	.025	17”	16”	3 1/2”	7 1/4”	12’8”
B-1 1/2	Trombone	C510	3/8”ID	.028	5/8”OD	.028	17”	16”	5 1/8”	7 5/8”	16’6”
B-2	Trombone	C510	3/8”ID	.028	5/8”OD	.028	18”	17”	6 1/8”	7 5/8”	22’0”
B-3	Trombone	C611	3/8”ID	.028	3/4”OD	.032	17”	16”’	8 3/4”	7 5/8”	22’8”
B-3X	Trombone	C611	3/8”ID	.028	3/4”OD	.032	21”	21	5 3/4”	16 3/4”	22’8”
B-5	Trombone	C611	5/8”OD	.035	11/8”OD	.046	18 3/8”	18 3/8’	10 3/8”	13”	43’8”
B-5X	Trombone	C611	5/8”OD	.035	11/8”OD	.046	25 1/2”	25 1/2”	5 1/2”	19 1/2”	41’
B-71/2	Trombone	C712	3/4”OD	.035	11/8”OD	.046	20”	20”	13 1/2”	12 1/2”	59’
B-10	Trombone	C611	5/8”OD	.035	11/8”OD	.046	19 1/2”	18”	15 1/2”	14 1/2”	76’
S-1/2	Spiral	C407	3/8”ID	.028	1/2” OD	.025	10 3/4”	9 1/2”	2”	10 1/2”	7’
S-3/4	Spiral	C407	3/8”ID	.028	1/2” OD	.025	11 1/2”	11 1/2”	2”	11 3/4”	10’
S-1	Spiral	C407	3/8”ID	.028	1/2” OD	.025	12”	12”	2”	12 1/2”	13’
S-1 1/2	Spiral	C510	3/8”ID	.028	5/8” OD	.028	14”	14”	2 1/8”	14 1/4”	16’6”
S-2	Spiral	C510	3/8”ID	.028	5/8” OD	.028	15 3/8”	15 3/8”	2 1/4”	15 3/4”	20’
S-2 1/2	Spiral	C611	3/8”ID	.028	3/4” OD	.032	15 3/8”	15 3/8”	2 1/2”	15 3/4”	20’
S-3	Spiral	C611	3/8”ID	.028	3/4” OD	.032	15 3/8”	15 3/8”	2 1/2”	15 3/4”	22’8”
S-3 3/4	Spiral	C712	1/2”OD	.032	7/8” OD	.032	19 1/2”	19 1/2”	2 7/8”	20”	29’
S-4	Spiral	C510	5/8”OD	.035	11/8” OD	.046	16	15 3/8”	4 3/4”	16”	38’6”
S-5	Spiral	C611	5/8”OD	.035	11/8” OD	.046	16 1/2”	16 1/2”	5 1/4”	15”	41’
S-7 1/2	Spiral	C712	3/4”OD	.035	11/8” OD	.046	22”	20”	5 5/8”	20 1/2”	58’
S-10	Spiral	C611	5/8”OD	.035	11/8” OD	.046	16 1/2”	16 1/2”	10 3/4”	15”	82’
H-1/3	Helix	C407	3/8”ID	.028	1/2” OD	.025	10 3/4”	9 3/4”	1 7/8”	9 3/4”	5’
H-1/2	Helix	C407	3/8”ID	.028	1/2” OD	.025	10 3/4”	9 3/4”	2 5/8”	9 3/4”	7’ 6”
H-3/4	Helix	C407	3/8”ID	.028	1/2” OD	.025	10 3/4”	9 3/4”	3 3/4”	9 3/4”	9’ 6”
H-1	Helix	C407	3/8”ID	.028	1/2” OD	.025	10 3/4”	9 3/4”	4 5/8”	9 3/4”	12’ 4”
H-1 1/2	Helix	C510	3/8”ID	.028	5/8”OD	.028	11”	10”	7 1/4”	10”	16’ 6”
H-2	Helix	C510	3/8”ID	.028	5/8”OD	.028	11”	10”	10”	10”	20’
H-3	Helix	C611	3/8”ID	.028	3/4”OD	.032	13”	12”S	12”	12”	22’ 8”

This table lists most common and most popular configurations. Other dimensions may be obtained however. Our large stock of bending jigs can solve your space problems.

Choosing the correct Water Source Heat Pump

To select the Edwards Heat Pump Coil which meets your requirements, use the Heating Mode Chart on the bottom of this page. Performance data is derived from laboratory and computer tests. Calculations are based on water and R-22. All temperatures for calculations are in Fahrenheit.

Step 1. Determine basic operating conditions.
  a. Entering water temperature (W1)
  b. Leaving water temperature (W2)
  c. Evaporator temperature/saturated suction temperature (SST)
  d. Evaporator capacity (QE)

Step 2. Calculate range (R)
  R = W1 - W2

Step 3. Calculate refrigerant approach (A)

  A = W2 - SST

Step 4. Evaporator capacity in BTUH

  Qe = GPM x 500 x R

Step 5. Refer to chart below for 8 degree range. For other ranges, contact the factory.

Step 6. Select column in chart based on Approach calculated in Step 3.

Step 7. Select model number which operated at a capacity in thousands of BTUH (MBH) equal to our greater than the evaporator capacity required.

Example

Determine basic operating conditions.
a. Entering water temperature (W1) =70 degrees
b. Leaving water temperature (W2) = 62 degrees
c. Saturated suction temperature (SST) = 45 degrees
d. Evaporator capacity (QE) in BTUH = 36,000

Calculate range (R)

R = 70 - 62 = 8

Calculate approacy (A)

A = 62 - 45 = 17

Select an Edwards evaporator.

At the 17 degree approach column, select model SEC-3-F with a capacity of 38,000 BTUH and 3.1 PSI water pressure drop.

Approach Temperature 8 degrees F range

MODEL	6		7		8		9		10		11		12		17		20		GPM @17
	MBH	PD	MBH	PD	MBH	PD	MBH	PD	MBH	PD	MBH	PD	MBH	PD	MBH	PD	MBH	PD	
HEC-1/2-FSEC-1/2-F	2.9	0.07	3.2	0.08	3.4	0.09	3.7	0.1	3.9	0.12	4.2	0.13	4.6	0.15	6.2	0.27	7.1	0.35	1.6
HEC-3/4-F/SEC-3/4-F	4.2	0.18	4.5	0.21	4.8	0.24	5.2	0.27	5.6	0.31	6.0	0.35	6.5	0.41	8.8	0.71	10.1	0.92	2.2
HEC.1.F/SEC-1-F	5.7	0.42	6.1	0.48	6.6	0.54	7.1	0.6	7.6	0.7	8.2	0.8	8.9	0.9	12.0	1.6	13.8	2.1	3.0
HEC-1 1/2 F/SEC-1 1/2-F	11.1	0.5	12.0	0.6	12.9	0.7	13.8	0.8	14.9	0.9	16.0	1.0	17.3	1.2	23.4	2.1	26.9	2.7	5.9
HEC-2-F.SEC-2-F	13.8	1.0	14.8	1.1	15.9	1.3	17.1	1.4	18.4	1.7	19.8	1.9	21.5	2.2	29.0	3.8	33.4	5.0	7.3
SEC-2 1/2-F	16.3	1.6	17.5	1.8	18.8	2.0	20.2	2.3	21.7	2.7	23.3	3.0	25.3	3.5	34.2	6.2	394	8.0	8.6
SEC-3-F	18.1	0.8	19.4	0.9	20.9	1.0	22.4	1.2	24.1	1.3	25.9	1.5	28.1	1.8	38.0	3.1	43.7	4.0	9.5
SEC-4-F	23.8	1.7	25.6	1.9	27.5	2.2	29.5	2.5	31.7	2.9	34.1	3.3	37.0	3.8	50.0	6.6	57.5	8.6	12.5
BEC-5-F	27.8	0.9	29.9	1.0	32.1	1.1	34.5	1.3	37.1	1.5	39.9	1.7	43.3	1.9	58.5	3.4	67.3	4.4	14.6
SEC-5-F	32.5	1.6	35.0	1.8	37.6	2.0	40.4	2.3	43.4	2.7	46.7	3.0	50.7	3.5	68.4	6.2	78.7	8.0	17.1
SEC-6-F	36.1	0.8	38.8	0.9	41.	1.0	44.9	1.2	48.2	1.3	51.9	1.5	56.3	1.8	76.0	3.1	87.4	4.0	19.0
SEC-8-F	47.5	1.7	51.1	1.9	54.9	2.2	59.1	2.5	63.5	2.9	68.2	3.3	74.1	3.8	100.0	6.6	115.0	8.6	25.0
SEC-10-F	65.0	1.6	69.9	1.8	75.2	2.0	80.8	2.3	86.8	2.7	93.4	3.0	101.3	3.5	136.8	6.2	157.3	8.0	34.2

PD = WATER PRESURE DROP LBS/SQ INCH.

Choosing the correct Condenser

To select the Edwards Condenser which meets your requirements, use the Water Cooled Condensers Chart below. Performance data is derived from laboratory tests and computer derived. Calculations are based on water and R-22. All temperatures for calculations are in Fahrenheit.

Step 1. Determine basic operating conditions.
- a. Entering water temperature (W1)
- b. Leaving water temperature (W2)
- c. Evaporator temperature/saturated suction temperature (SST)
- d. Desired condensing temperature (CT)
- e. Evaporator capacity (QE) in BTUH
- f. condenser load (QC) in BTUH.

Step 2. Calculate temperature difference

TD = CT - W

Step 3. Calculate range (R)

R = W2 - 21

Step 4. If condenser load is known, proceed to step 5. If condenser load is not known, use the Heat Rejection Chart to select the fR and multiply by the evaporator capacity.

Step 5. Calculate water flow rate (GPM), gallons per minute.

GPM = QC / (500 x R)

Note: Normal cooling tower applications use W1 = 85 :W2 = 95; GPM = 3.0 per ton of evaporator capacity.
City water applications use W1 = 75; W2 = 95; GPM = 1.5 per ton of evaporator capacity.

Step 6. Select from chart, page 2 for TD of 20 degrees or 25 degrees calculated in step 2. If the temperature difference falls between the two charts, interpolate the data.

Step 7. Select column in chart based on GPM calculated in step 5.

Step 8. Select model number which operates at a capacity on thousands of BTUH (MBH) equal to or greater than the known condenser capacity or as calculated in

EXAMPLE

Determine basic operating conditions.
- a. Entering water temperature (W1) = 85
- b. Leaving water temperature (W2) = 95
- c. Evaporator temperature/saturated suction temperature (SST) = 40
- d. Desired condensing temperature (CT) = 105
- e. Evaporator capacity (QE) in BTUH = 60,000
- f. condenser load (QC) in BTUH. = known or calculated

Calculate temperature difference

(TD) = 105 - 85 = 20

Calculate range (R)

R = 95 - 85 = 10

Since condenser load is not known, use the Heat Rejection Chart to select the fR of 1.2 for CT of 105 and SST of 40. Condenser load is:

QC = 60,000 x 1.20 = 72,000 BTUH

Calculate water flow rate (GPM)

GPM = 72,000 / (500 x 10) = 14.4 GPM

Select an Edwards condenser

Using the 20 degree Temperature Difference Table and the 14 GPM and 16 GPM column, select model S-5-I with a capacity of 72,000 GTUH and pressure drop between 2.9 PSIG and 6.3 PSIG.

CT	Evaporator Temperature - SST					
	0	10	20	30	40	50
115 F	1.38	1.34	1.3	1.26	1.23	1.2
105 F	1.34	1.31	1.27	1.23	1.2	1.17
95 F	1.31	1.27	1.23	1.2	1.17	1.14

20 degree temperature difference

MODEL	Water Flow Rate - GPM 1		2		3		4		5		6		8		10		12		MAX GPM
	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	
S-1-1	7.6	0.3	11.4	0.9	14.5	2.0	18.1	3.3	20.1	5.0	21.9	7.0							6
S-1.5-1	8.9	0.4	14.0	1.2	17.8	2.6	22.4	4.5	25.1	6.7	27.1	9.4							6
S-2-1			14.1	0.4	17.9	0.8	21.0	1.4	23.9	2.1	26.5	3.0	32.5	5.1	36.5	7.7			10
S-2.5-1			16.2	0.5	20.9	1.1	24.7	1.8	28.2	2.7	31.5	3.8	38.9	6.5	43.7	9.8			10
S-3-1					20.7	0.4	24.5	0.7	27.8	1.0	30.5	1.5	35.9	2.5	43.3	3.8	47.7	5.3	12
S-3.5-1					23.6	0.5	28.2	0.9	32.2	1.3	35.7	1.8	42.0	3.1	50.8	4.7	56.1	6.6	12
	8		10		12		14		16		20		24		28		32		
S-4-1	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	20
S-5-1	42.0	1.4	47.2	2.1	52.3	3.0	60.1	4.0	64.2	5.0	72.1	7.6							20
S-6-1	48.8	1.7	55.3	2.6	61.4	3.7	70.6	4.9	75.7	6.3	85.5	9.5							24
S-7-1	56.4	1.1	64.5	1.5	71.4	2.0	77.8	2.6	84.4	3.3	101.6	4.9	112.2	6.8					24
S-8-1							78.4	1.3	84.0	1.6	94.4	2.3	104.6	3.1	120.2	4.1	128.4	5.2	32
S-10-1							90.8	1.6	97.6	1.9	110.6	2.8	122.8	3.9	141.6	5.1	151.4	6.5	32

25 degree temperature difference

MODEL	Water Flow Rate - GPM 1		2		3		4		5		6		8		10		12		MAX GPM
	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	
S-1-1	9.6	0.3	14.7	0.9	18.5	2.0	22.2	3.3	25.8	5.0	28.3	7.0							6
S-1.5-1	11.3	0.4	17.8	1.2	22.8	2.6	28.7	4.5	32.2	6.7	35.5	9.4							6
S-2-1			17.9	0.4	22.8	0.8	26.9	1.4	30.5	2.1	34.0	3.0	41.7	5.1	46.4	7.7			8
S-2.5-1			20.6	0.5	26.6	1.1	31.6	1.8	36.1	2.7	40.4	3.8	49.8	6.5	55.8	9.8			8
S-3-1					26.4	0.4	31.2	0.7	35.5	1.0	39.2	1.5	46.1	2.5	55.5	3.8	61.1	5.3	12
S-3.5-1					30.0	0.5	35.8	0.9	41.0	1.3	45.5	1.8	54.0	3.1	65.0	4.7	72.0	6.6	12
	8		10		12		14		16		20		24		28		32		
S-4-1	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	BTUH	PD	20
S-5-1	63.7	1.4	60.5	2.1	67.0	3.0	77.0	4.0	82.5	5.0	92.7	7.6							20
S-6-1	62.2	1.7	70.6	2.6	78.4	3.7	90.2	4.9	96.9	6.3	109.3	9.5							24
S-7-1	62.4	0.9	71.0	1.2	78.4	1.7	85.4	2.1	93.2	2.7	111.0	4.0	122.2	5.5					24
S-8-1							100.2	1.3	107.4	1.6	121.0	2.3	134.0	3.1	154.0	4.1	165.0	5.2	32
S-10-1							115.4	1.6	124.4	1.9	141.2	2.8	156.8	3.9	180.4	5.1	193.8	6.5	32