ECODYNE
Heat Exchangers

8203 Market Street Road
Houston, Texas 77029
Phone: 713.675.3511
Fax: 713.675.7922

REVS	No	Date	Description
	0	**10/06/14**	**Order Basis**

Air Cooled Exchanger Specification

1	Customer					Sheet No.	**1 of 1**		
2						Ecodyne Ref. No.			
3	Address		Plant Location			Customer Ref. No.			
4			**Z**			Item No.			
5	Service **Cooling Water Module**								
6	Bay Qty. **2**	Size **15W-54L-3i13**			Draft Type **Induced**			Item Qty. **3**	
7	Surface Per Item…….....Extended	**197,089**	ft^2		Surface per Ite…….Bare Tube	**9,183**	ft^2		
8	Heat Exchanged	**12,460,000**	BTU/h		Effective MTD	**17.5**	°F		
9	Transfer Rate…Extended, Service	**4.00**	$BTU/h{\cdot}ft^2{\cdot}°F$		Transfer Rate Bare Tube, Svc	**84.25**	$BTU/h{\cdot}ft2{\cdot}°F$		
10	**PERFORMANCE DATA**								

11		Fluid Name	**60% EG / Water**				Specific / API Gravity @ 60°F			
12		Total Flow Rate lbs/h, GPM	**1,278,620**		**2,353**		Inlet Pressure **psig**			
13	**T**		IN		OUT		Dew Point °F			
14	**U**	Temperature °F	**89.5**		**77**		Bubble Point °F			
15	**B**	Liquid lbs/h	**1,278,620**		**1,278,620**		Pour/Freeze Point °F			
16	**E**	Vapor lbs/h, MW					Latent Heat BTU/lb			
17		Non-Condensibles lbs/h, MW					Allowable Fluid Velocity ft/s			
18	**S**	Steam lbs/h					Des. Max. Fluid Velocity ft/s			
19	**I**	Water lbs/h					Allowable Pressure Drop psi			
20	**D**	Specific Heat (V/L) BTU/lb·°F	/ **0.774**		/ **0.766**		Design Pressure Drop psi	**9.9**		
21	**E**	Conductivity (V/L) BTU/h·ft·°F	/ **0.207**		/ **0.205**		Fouling I.S. $h{\cdot}ft^2{\cdot}°F/BTU$	**0.0015**		
22		Density (V/L) lbs/ft^3	/ **66.48**		/ **66.75**		**Air side fouling**	**0.0015**		
23		Viscosity (V/L) cP	/ **3.27**		/ **4.1**					
24	**A**	Flow Rate lbs/h	**4,398,047**				Altitude ft	**2,043**		
25	**I**	Temperature In & Out °F	**59**		**70.65**		Minimum Design Ambient °F	**-59**		
26	**R**	Flow Rate Per Fan ACFM	**172,067**				Static Pressure Loss in. WG	**0.565**		
27	**DESIGN, MATERIALS, AND CONSTRUCTION**									

28	Design/Test Pres. psi **150** / **Code**				Design Temp / MDMT °F **200** / **-58**				Fin Select Temp °F	
29	**B**	Size **330-8-648ST20-5**			Type **Plug Box**				X-Ray **Spot** , S.R. **No**	
30	**U**	#/Bay **1** (WxL) ft **15** x **54**			Material **SA-240 304 SS**				Code **ASME Sec. VIII, Div. I / API 661**	
31	**N**	Arrangement **Horizontal**			**5** Rows **2** Passes				Prep./Coat **None**	
32	**D**	**1** Bundles Parallel/ Series			Slope **0** in/ft, Pass					
33	**L**	**2** Bays Parallel/ Series		**H**	Plug/Gasket Mat'l **SS** / **SS**				Material **SA-249 TP304 SS**	
34	**E**	Total Bundles Per Item **2**		**E**	Corrosion Allowance **0.0** in.				**T** OD **1.0** in.	
35		Struct. Prep./Coat **Galvanize**		**A**	NOZZLE	No.	SIZE	RATING	**U** **0.065** in. **AVG** Wall	
36		Struct. Mount **Grade**		**D**	Inlet	**1**	**8"**	**150#RFWN**	**B** No/Bundle **330**	
37	**M**	Ladder **HDR** Walkway **HDR**		**E**	Outlet	**1**	**8"**	**150#RFWN**	**E** Length **54** ft.	
38	**I**	Fan Guard **Yes** Steam Coil **None**		**R**	Vent	**1**	**2"**	**150# rflwn**	Pitch **2.5** in. Layout **Triangular**	
39	**S**	Vibration Switch **1/ fan**			Drain	**1**	**2"**	**150# rflwn**	**F** Material **Aluminum(SB-209-1100)**	
40	**C**	Screen **None** Mat'l **N/A**			P-Taps				**I** Fin OD **2.25** in.	
41		Louver Mat'l **Aluminum**			T-Taps				**N** Fins Per Inch **10**	
42		Action **Para** Operator **Pneu**			Cleaning				**S** Attachment Method **L-footed**	
43	**MECHANICAL EQUIPMENT**									

44		Type **Axial Flow**		Type **Electric Motor**			**Speed Reducer**	Type **HTD Belt**	
45		No/Bay **3** Max. Amb. Fan HP **25.3**	**D**	No/Bay **3**				No/Bay **3**	
46	**F**	Dia **13** ft Min. Amb. Fan HP **35.9**	**R**	**40** HP @ **1800** RPM				S.F. **2.0**	
47	**A**	No. of Blades **4** RPM	**I**	Volt **600** , Phase **3** , Cycle **60**				Manufacturer	
48	**N**	Blade/Hub Material **Al/Al**	**V**	Frame , Enclosure **TEFC**			**Coupling**	Type **N/A**	
49		Pitch Adj. **Manual**	**E**	S.F. **1.15** , S.H. Voltage **120**				No/Bay	
50		Manufacturer	**R**	Mfg.				S.F.	
51		Calc. **85** dBA @ Dist. ft. **3**						Manufacturer	

52 Plot (WxL) ft. **31** x **56** Shipping Weight lbs Proposal Drawing No.

53 Notes:

54 **(A) Pumps include 150 HP motors (2,352 gpm w/ 160' TDH) based on 115' external head losses.**

55 **(B) Satic head/expansion tank capacity is 500 gallons.**

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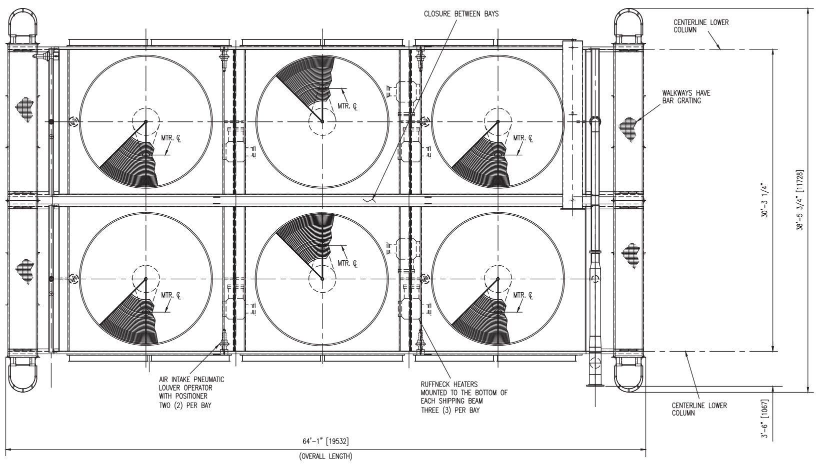
Heat Exchangers

**Note: Please the IVCS for further information on Major Components.

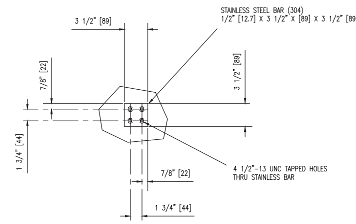
Quantity Based on 1 Unit

Item	Qty.	Description	Part #
1	2	Air Cooled Heat Exchanger, 15W-54L-3I13	14496-101FA
2	8	Lower Columns - End	14496-101-SHT19
3	8	Lower Columns - Interior	14496-101-SHT30
4	16	Lower Column Knee Brace	14496-101SHT18
DRIVE ASSEMBLY PARTS			
5	6	Fan	1305-FAN-MO-0082
6	6	Fan Motor	1310-MF-040-1800-S30358
7	6	Inlet Bell (7 SECTIONS)	1398-INLETBELL-HUDSON 81213SET
8	6	Spin Doctor	1320-SPIN-DR
9	6	Driver Sprocket	1320-SPR-P28-EHX01-55
10	6	Driven Sprocket	1320-SPR-P192-EHX01-55
11	6	Driver Bushing	1320-BUSH-QDSK-21250
12	6	Driven Bushing	1320-BUSH-QDF-29375
13	6	Bearing - Bottom	1320-BRG-023227-29375-K
14	6	Bearing - Top	1320-BRG-023249-29375-K
15	30	Belt	1320-BLT-HTD-3360-EHX01-55
16	6	Belt Guard	14496-106 SHT1
17	6	Vibration Switch	2315-1018
18	6	**Grease Line Kit (Per Drive Assembly)**	14496-GREASE LINE KIT
		Includes:	
PUMP SKID ASSEMBLY PARTS			
19	2	Pump	1421-PMPGO-S30358
20	2	Pump Motor	1445-MP-150-1800-S30358
21	2	Check Valve 12"	1450-VLV-0165
22	2	Butterfly Valve 12"	1450-VLV-0163
23	4	Gasket 12"	1172-GSKT-120-0150-NA-RF-1250
24	2	Gasket 6"	1172-GSKT-060-0150-NA-FF-1250
25	2	Gasket 8"	1172-GSLT-080-0150-NA-FF-1250
26	2	Differential Pressure Transmitter	1451-INS-0037
PIPING ASSEMBLY PARTS			
27	1	Bypass Valve	1450-VLV-0168
28	4	Butterfly Valve 8"	1450-VLV-0164
29	1	Y-Strainer 12"	1450-VLV-0167
30	1	Gasket 12"	1172-GSKT-120-0150-NA-RF-1250
31	2	Gasket 12"	1172-GSKT-120-0150-NA-FF-1250
32	4	Gasket 8"	1172-GSKT-080-0150-NA-RF-1250
33	4	Butterfly Valve 12"	1450-VLV-0163
34	2	Thermowell	1451-INS-0160
35	1	Thermometer	1451-INS-0034
36	1	Thermometer	1451-INS-0178
37	2	RTD	1451-INS-0194
38	3	Needle Valve, 1/4"	1450-VLV-0173

39	2	Pressure Gauge, 0-30 PSIG	1451-INS-0120
40	1	Pressure Gauge, 0-60 PSIG	1451-INS-0122
41	1	Pressure Gauge, 0-160 PSIG	1451-INS-0138
42	3	Gate Valve, 3/4"	1450-VLV-0170
43	3	Air Eliminator	1451-INS-0003
44	6	Pump Skid Washer	14496-108SK-SHT6
45	2	Gate Valve 2"	1450-VLV-0068
46	1	Check Valve 2"	1450-VLV-0166
47	1	RTD, Ambient Air	1451-INS-0014
SURGE TANK ASSEMBLY PARTS			
48	1	Surge Tank, 30" Dia	14496-104-SHT1
49	1	Liquid Level Indicator	1451-INS-0032
50	2	J-Box Switch	1451-INS-0023
51	2	Surge Tank Knee Braces	14496-104-SHT3
52	1	Vent	2441-1054
WINTERIZATION ASSEMBLY PARTS			
53	6	Heaters	1398-SPACE HEATER RUFFNECK-4
54	6	Louver - Lower Side Air Intake	14496-103-SHT2
55	6	Pneumatic Actuator - Air Intake	(Part of Louver Assembly)
56	6	Top Discharge Louver	14496-103LD-SHT1
57	6	Pneumatic Actuator - Discharge Side	(Part of Louver Assembly)
58	8	Proximity Switches	(Part of Louver Assembly)
59	4	Solenoid Valves	(Part of Louver Assembly)
WALKWAY ASSEMBLY PARTS			
60	1	Header Walkway - Floating Header	14496-101WL-SHT8
61	1	Header Walkway - Stationary Header	14496-101WL-SHT1



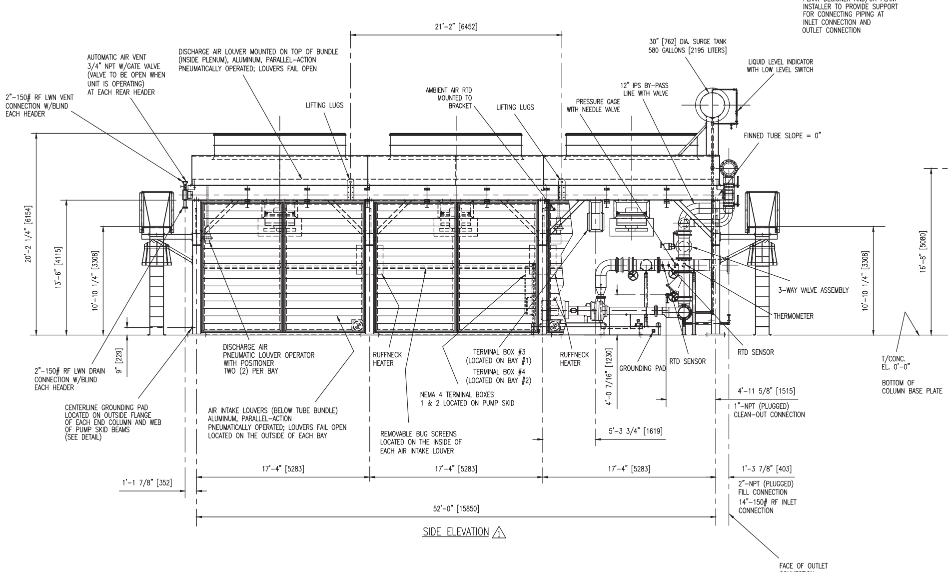
PLAN VIEW



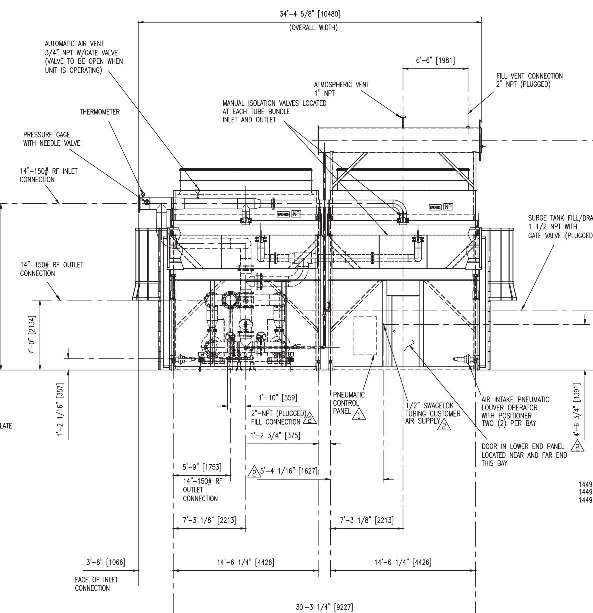
GROUNDING PAD DETAIL
SCALED 8X

CUSTOMER INTERFACES		MATERIAL/ GRADE
INLET CONNECTION	14"-150# RF FLANGE	SA-105 FS ANSI STD.
OUTLET CONNECTION	14"-150# RF FLANGE	SA-105 FS ANSI STD.
CLEAN-OUT CONNECTION LOCATED ON WYE-STRAINER	1" NPT GATE VALVE, (PLUGGED)	A-126, Iron
SURGE TANK FILL	2" NPT HALF COUPLING, (PLUGGED)	SA-105 FS
SURGE TANK FILL, ON TANK	2" NPT HALF COUPLING, (PLUGGED)	SA-105 FS
SURGE TANK DRAIN, ON TANK	1" NPT HALF COUPLING, (PLUGGED)	SA-105 FS
SURGE TANK DRAIN	1 1/2" NPT GATE VALVE, (PLUGGED)	A-126, Iron

NOTE:
PLANT DESIGNER AND/OR PLANT INSTALLER TO PROVIDE SUPPORT FOR CONNECTING PIPING AT INLET CONNECTION AND OUTLET CONNECTION



SIDE ELEVATION



FRONT ELEVATION

RELATED DRAWINGS
14496-001 Sht 2 ANCHOR BOLT PLAN
14496-001 Sht 3 PURCHASER INFORMATION SHEET
14496-1DPD P & ID DRAWING

UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
FRACTIONAL ± 1/16

REV	DATE	BY	DESCRIPTION	CHK'D	APPROVED
2	6/25/15	AG	REVISED TO SHOW AS BUILT.		
1	02/19/15	AG	UPDATED DRAWING VIEWS.		
0	10/24/14	GLH	ORIGINAL RELEASE	-	

ECODYNE HEAT EXCHANGERS Houston, Texas (713) 675-3511

2-#15W-54L-3I13 INDUCED DRAFT GENERAL ARRANGEMENT

PART NO: 14496-001-Sht1
SIZE: E SCALE: 1:48 REV: 2

PHYSICAL

1) ESTIMATED DRY WEIGHT PER EXCHANGER BAY: 82,800 LBS.[29,625 Kg]
2) ESTIMATED LIQUID CAPACITY: 2480 GALLONS [9,387 LITERS] TOTAL
3) ESTIMATED FLOODED WEIGHT PER EXCHANGER BAY: 90,840 LBS.[41,205 Kg]
4) MATERIALS PROVIDED:
   TUBE BUNDLE HEADER BOXES: SA-240, 304 SS
   TUBES: SA-249, TP304 SS
   FINS: ALLOY 1100 ALUMINUM
   FLANGES: SA-182, F304 SS
5) UNIT ANCHORS - (64), 1 "[25] DIAMETER - ARE TO BE SUPPLIED BY PURCHASER. REFER TO SHEET 3. THE DESIGN OF THE ANCHOR BOLTS AND THE DEPTH OF FOOTINGS ARE DEPENDENT ON LOCAL CODES AND SOIL CONDITIONS.
6) ALL FLANGE BOLT HOLES TO STRADDLE NATURAL CENTERLINES

DESIGN

1) TUBE BUNDLES ARE TO BE STAMPED PER ASME CODE, SECTION VIII, DIV 1, WITH NATIONAL BOARD REGISTRATION
2) TUBE BUNDLE DESIGN DATA:
   DESIGN PRESSURE = 150 PSIG
   DESIGN TEMPERATURE = 200° F
   TEST PRESSURE = 195 PSIG

TESTING

1) FAN BLADES ARE TO BE MOMENT BALANCED AND FAN HUBS DYNAMICALLY BALANCED WITH CERTIFICATES SUPPLIED
2) COMPLETED COOLER IS TO HAVE AIR FLOW CONFIRMED PER ECODYNE HEAT EXCHANGER PROCEDURE.
3) COMPLETED COOLER IS TO BE SOUND LEVEL TESTED PER ECODYNE HEAT EXCHANGER PROCEDURE. MAXIMUM SOUND LEVEL NOT TO EXCEED 85 dBA (SPL) AT 3 FEET FROM SIDE OF UNIT.
4) COMPLETED COOLER IS TO BE VIBRATION TESTED PER ECODYNE HEAT EXCHANGER PROCEDURE.
5) TUBE BUNDLES ARE TO BE HYDROSTATICALLY TESTED FOR A MINIMUM OF ONE HOUR PER ECODYNE HEAT EXCHANGER PROCEDURE.
6) IMPACT TESTING WILL CONSIST OF ONE (1) TEST PER HEAT LOT OF THE FOLLOWING
   COLUMNS
   BASE PLATES
   LIFT LUGS
   LATERAL STABILITY BRACES
   MINIMUM ACCEPTABLE IMPACT VALUES SHALL BE 5 JOULES AT -40°F.

PREPARATION AND FINISH

1) COATINGS:
   a. STRUCTURAL STEEL: HOT-DIP GALVANIZED PER ASTM A-123.
   b. TUBE BUNDLE HEADERS: STAINLESS STEEL - BARE, NO COATING
   c. MANUFACTURED PRE-PAINTED ITEMS: TOP COAT USING TWO-PACK EPOXY
   d. PIPING: EXTERIOR STAINLESS STEEL - BARE, NO COATING;
   e. EXPANSION TANK: EXTERIOR SURFACES TO BE SANDBLASTED PER SSPC-SP10. PRIME USING INORGANIC ZINC PRIMER; TOP COAT USING TWO-PACK EPOXY. FINISH COLOR TO BE GRAY. THICKNESS TO BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
   INTERIOR SURFACES ARE TO BE SANDBLASTED PER SSPC-SP6. OIL MIST AND CAP ENDS.
2) SHOULDER PLUGS AND GASKETS TO BE INSTALLED AND TIGHTENED PER ECODYNE HX PROCDEURE WITH THE SHOULDER PLUGS COATED USING THE APPROPRIATE ANTI-SEIZE THREAD LUBRICANT.
3) FAN SHAFT BEARINGS INCLUDE 304SS FLEXIBLE, BRAIDED LUBE LINES FOR REMOTE LUBRICATION.
4) HEAT EXCHNAGER BAYS TO BE SHIPPED FACTORY ASSEMBLED; ITEMS SHIPPED LOOSE WILL BE MATCH MARKED FOR FIELD ASSEMBLY.

SHIPPING AND HANDLING

1) PURCHASER TO LIFT HEAT EXCHANGER BAYS FROM HEAT EXCHANGER TUBE BUNDLE LIFTING LUGS USING A SPREADER BEAM PERPENDICULAR TO THE LENGTH OF THE BAY TO MAINTAIN A VERTICAL LIFT. REMOVE LUG RETAINING BOLTS PRIOR TO LIFTING. DO NOT LIFT FROM A SINGLE POINT DIRECTLY ABOVE THE UNIT. LIFTING WEIGHT OF BAYS - WITHOUT LOWER COLUMNS, KNEE BRACES, EXPANSION TANK AND INTERCONNECTING PIPING IS 55,100 LBS [24,993 Kg] PER BAY.
2) PRIOR TO START-UP, VERIFY FAN ROTATION IS NOT OBSTRUCTED AND DIRECTION OF ROTATION MATCHES ARROWS ON FAN RINGS.
3) FOR SHIPMENT, TUBE BUNDLES ARE SEALED WITH METAL BOLT-ON COVERS AND RUBBER GASKETS AND CHARGED WITH 3-5 PSIG DRY NITROGEN CHARGE PER ECODYNE HEAT EXCHANGER PROCEDURE.
4) ITEMS SHIPPED FOR FIELD INSTALLATION INCLUDE: TWO (2) HEAT EXCHANGER BAYS, LOWER COLUMNS, KNEE BRACES, PUMP SKID WITH PUMPS AND MOTORS, PIPING TO CONNECT BAYS AND PUMP SKID, EXPANSION TANK, TWO (2) THERMOMETERS, THREE (3) PRESSURE GAUGES, BY-PASS VALVE ASSEMBLY, THREE (3) AUTO. AIR VENTS, THREE (3) RTD'S, FOUR (4) 8" BUTTERFLY VALVES, EXPANSION TANK PIPING, LIQUID LEVEL SUB-ASSEMBLY, CONDUIT AND WIRING BETWEEN TERMINAL BOXES #3 AND #4 AND TERMINAL BOX #1 LOCATED ON PUMP SKID, LOWER PANELS, LOUVER SUPPORT PANELS, DOORS, CLOSURE BETWEEN BAYS, LOWER SIDE LOUVERS, ACTUATORS, WALKWAY BRACKETS, WALKWAYS, WALKWAY HANDRAILS. CAGED LADDERS, AND ALL REQUIRED HARDWARE.
5) PUMP SKID TO BE INSTALLED BEFORE HEAT EXCHANGER. USE SPREADER BEAM WITH CHAINS TO VERTICALLY LIFT AT LIFTING LUGS.

NOTES

1) UNIT TO BE INSTALLED IN AREA FREE OF AIR FLOW OBSTRUCTIONS. AREA UNDERNEATH THE HEAT EXCHANGER, AS WELL AS AROUND THE PERIMETER ARE TO BE KEPT CLEAR. DO NOT INSTALL ADDITIONAL EQUIPMENT IN THESE AREAS WHICH WOULD IMPEDE AIR FLOW. RECOMMENDED LOCATION OF HEAT EXCHANGER IS A MINIMUM OF ONE FAN DIAMETER FROM THE NEAREST BUILDING.

UNLESS OTHERWISE SPECIFIED:
TOLERANCES:
FRACTIONAL ± 1/16

REV	DATE	BY	DESCRIPTION	CHK'D	APPROVED
	10/28/14	GLH	PRELIMINARY RELEASE		

ECODYNE HEAT EXCHANGERS
Houston, Texas
(713) 675-3511

2 #15W-54L-3113 INDUCED DRAFT
PRODUCT INFORMATION SHEET

PART NO: 14496-001-Sht3
SIZE: C | SCALE: 1:1 | REV: 0

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