Jessica R. Baker

The Montgomery County Conference Center and Hotel (MCCCH), Rockville, MD

Appendix E: Electric Central Chilling Plant - Mechanical Equipment

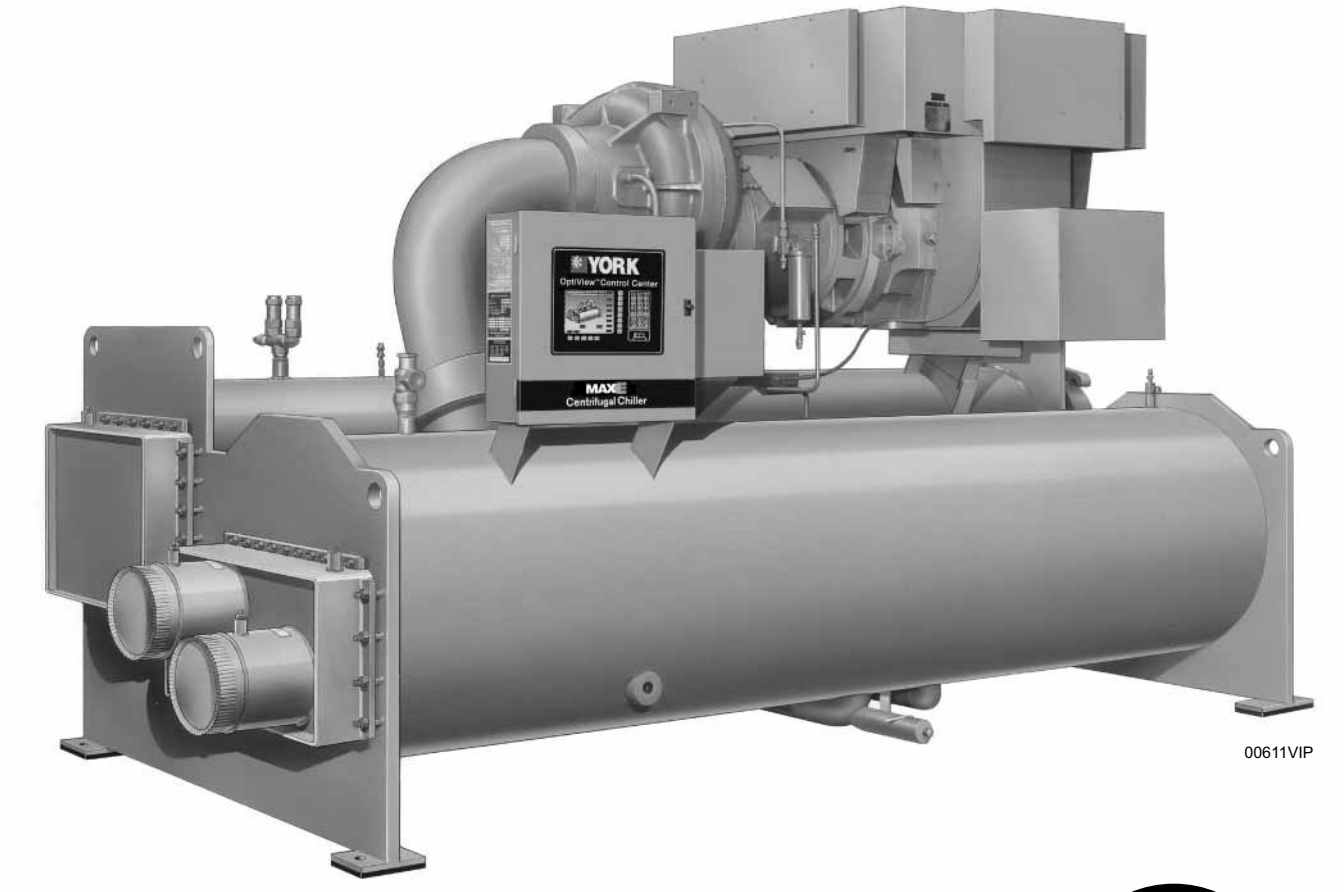
PENNSTATE

YORK®

MAXE™

Centrifugal Liquid Chillers

Design Level F



00611VIP

250 THROUGH 2400 TONS
(879 through 8440 kW)
Utilizing HFC-134a

Metric Conversions

MANUFACTURER CERTIFIED TO ARI AS COMPLYING WITH • WATER CHILLING PACKAGES USING THE VAPOR COMPRESSION CYCLE • CERTIFICATION SECTIONS OF ARI STANDARD 550/590

Rated in Accordance with the latest edition of ARI STANDARD 550/590

YR MAXE CHILLER
PERFORMANCE SPECIFICATION

Unit Tag	Qty	Model No.	Capacity (tons)	Power	Refrigerant
CH-1 & 2	2	YRVDVDT1-46C	300	460/3/60	R-134A

Unit Data	Evaporator	Condenser
EWT (°F):	54.00	85.00
LWT (°F):	44.00	94.40
Flow Rate (gpm):	720	900
Pressure Drop (ft):	27.0	26.7
Fluid Type (%):	WATER	WATER
Circuit No. of Passes:	2	2
Fouling Factor (ft² °F hr / Btu):	0.00010	0.00025
Tube No. / Description:	281 -	260 - 0.025" CSL Enhanced Copper
Design Working Pressure (psig):	150	150
Entering Water Nozzle @ Location:	C	R
Leaving Water Nozzle @ Location:	B	S
Water Box Weight, ea (lbs) :	166	128
Cover Plate Weight , ea (lbs):	N/A	N/A
Return Head Weight (lbs):	132	101
Water Weight (lbs):	507	581

Performance Data		Electrical Data		Other	
KW:	181	RLA:	259	Operating Wt. (lbs):	16319
KW/Ton:	0.603	LRA:	1488	Per Isolator (lbs):	4080
IPLV (1):	0.459	Inrush Amps:	669	Refrigerant Wt. (lbs):	900
		Min Circuit Ampacity (Amps):	323	Oil Charge (gal):	10
		Max Fuse/Breaker:	500	Motor Wt. (lbs):	N/A
				Compressor Wt. (lbs):	4560
				Oil Separator Wt. (lbs):	1400
				Starter Wt. (lbs):	200
				Shipping Wt. (lbs):	15231
		Type Starter: Solid State Starter			

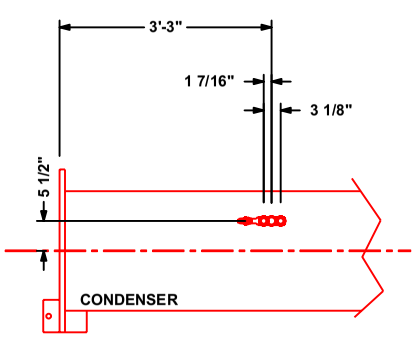
Notes:

(1) Chiller IPLV value calculated to ARI Standard 550/590-98 equation.

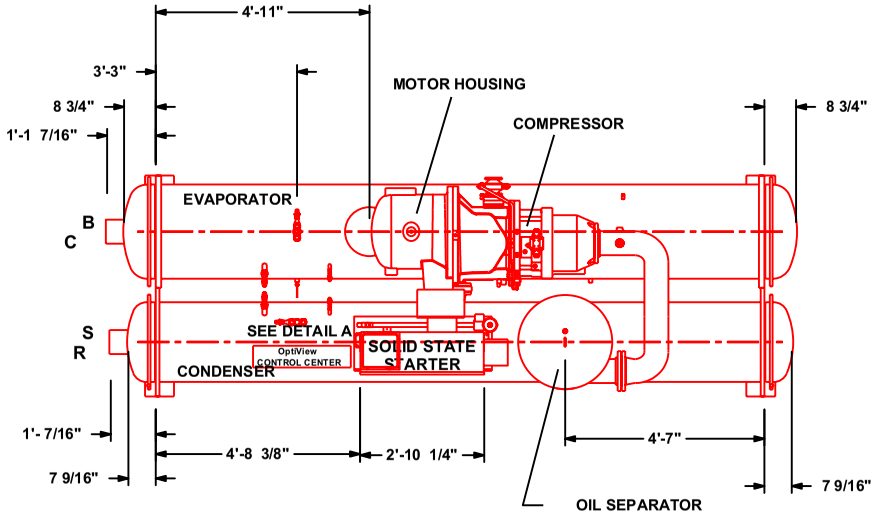
Project Name: Jessica Baker Chiller	Sold To:	
Location:	Customer Purchase Order No.:	
Engineer:	York Contract No.:	
Contractor:	Date:	Revision Date:

NOZZLE LEGEND

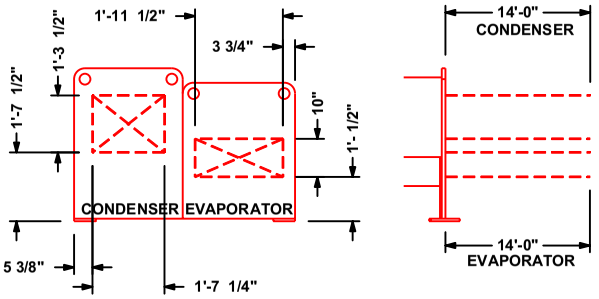
EVAPORATOR INLET "C" 2 PASS 6" DIA.(150 Psig DWP)
EVAPORATOR OUTLET "B" 2 PASS 6" DIA.(150 Psig DWP)
CONDENSER INLET "R" 2 PASS 6" DIA.(150 Psig DWP)
CONDENSER OUTLET "S" 2 PASS 6" DIA.(150 Psig DWP)

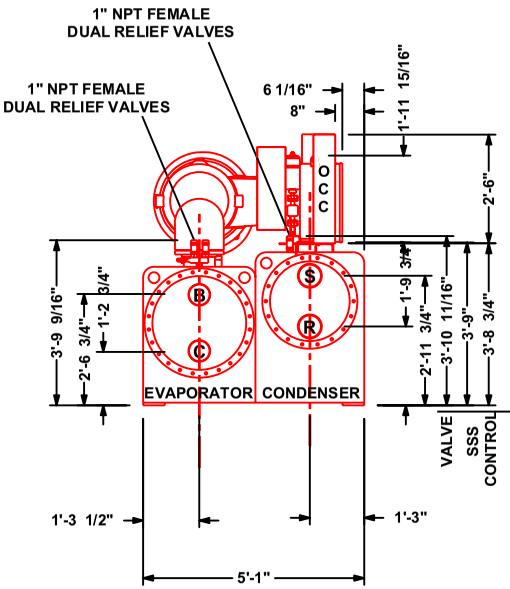


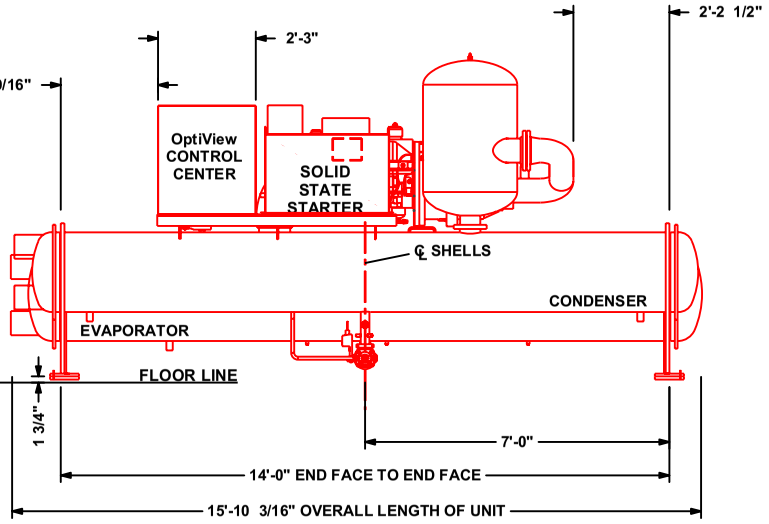
DETAIL A

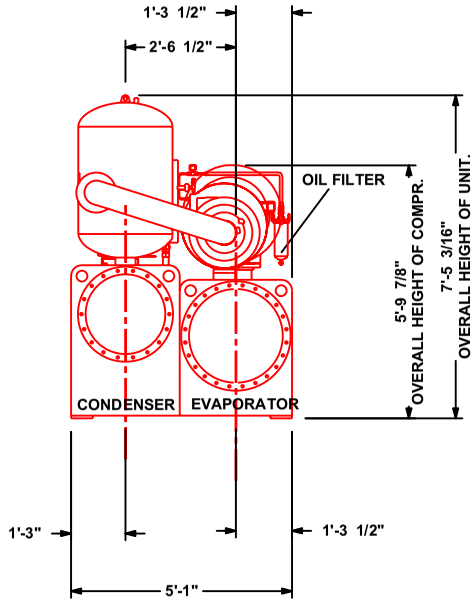


TUBE PULL AREA DETAIL









SHIPPING WT.: 15231 LBS, OPERATING WT. 16319 LBS, LOAD PER ISOLATOR 4079 LBS

PRODUCT DRAWING

MaxE Screw Liquid Chiller
MODEL YR VD VD T1 - 46 C
NOT FOR CONSTRUCTION

Project Name : Jessica Baker Chiller
Location : ,
Engineer :
Contractor :
For : REFERENCE

Sold To :
Cust Purch Order# :
York Contract# :

UNIT TAG: CH-1 & 2

Date : Mar 14, 2005
Rev. Date : 5:13 PM
Form: 160.81-PA1
Dwg. Lev. : 302
Dwg. Scale : NTS

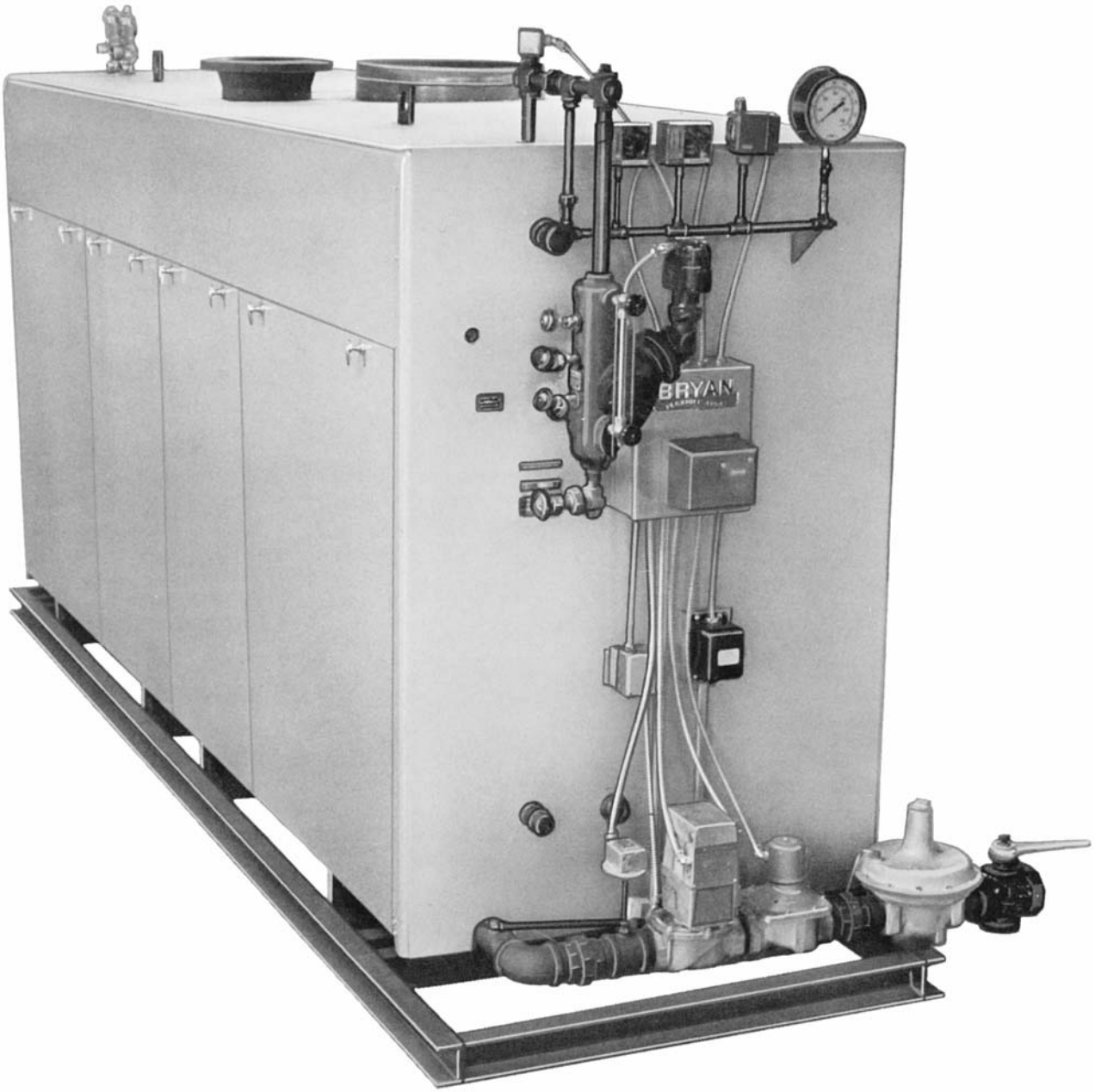
YORK®

Form No. 5000-4
(Rev. 8/90)

Bryan "Flexible Water Tube"

K Series Steam Boilers

60 through 155 HP (15 or 150 psi)
Atmospheric gas fired



BRYAN BOILERS

Originators of the "Flexible Water Tube" design

Bryan K Series gas fired steam boilers for space heating systems, high/low pressure process steam.

Bryan flexible water tube steam boilers are ideally suited for steam space heating systems as well as for furnishing either high or low pressure process steam. Hospitals, dairies, restaurants, laundries, dry cleaners, foe processing, tire recapping and metal plating are just a few of the many applications.

Efficient "Flexible Water Tube" design

The Bryan bent water tube provides rapid internal circulation — for maximum heat transfer and operating efficiency, Flexible— no thermal shock.

Easily replaceable tubes

Tubes are easily removable and replaceable without welding or rolling. Requires little service space because all servicing is from one side.

Steam release area

Large, full-size steam drum provides for dry steam and stable water level.

Natural internal circulation

Water tube design and the large downcomer legs provide positive internal circulation.

Compact—minimum floor space

Unit requires less floor space than most boilers, permitting minimum boiler room size, Shipped completely assembled and wired.

High or low pressure construction

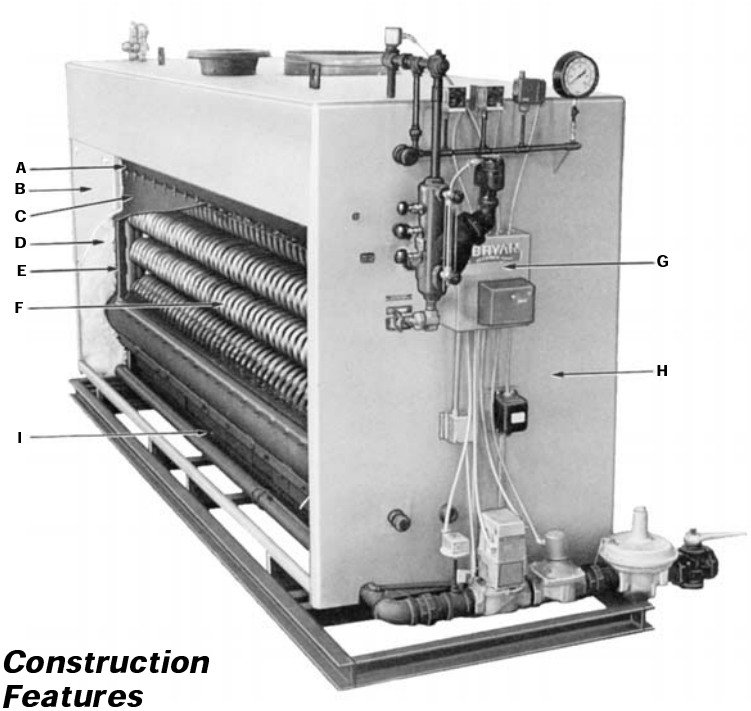
Boiler is constructed as standard for either 15 psi or 150 psi maximum working pressure. Also available for higher pressures to 350 psi.

Standard equipment

Combination low water cutoff and pump control, auxiliary probe type low water cutoff, operating pressure control, high limit pressure control, ASME-rated pop safety relief valve, water glass set, electric gas valve, auxiliary gas valve, gas pressure regulator manual gas shutoff valve, electronic pilot safety control, standing pilot, steam pressure gauge, heavy jacket with fiberglass insulation, barometric draft control. All controls mounted and wired.

Optional equipment

Manual reset high limit pressure control; two-stage or modulating firing controls; low fire start; dual fuel gas burner (example-natural and propanes; alarm bells; FM, IRI or other insurance-approve control systems; indicating lights as desired; condensate return and boiler feed system; Boiler and control blow-down assembly; induced draft fans; heat exchanger coils for domestic water or other purposes (with 15 psi rated units only); higher operating pressure—to 350 psi; auxiliary electric steam superheaters—to 700°F; contact factory for additional options and special construction (knock-down construction for entry into existing buildings).



Construction Features

A. Heavy steel boiler frame, built and stamped in accordance with ASME boiler code.

B. Access panels. Interior of boiler easily accessible for service and inspection. Entire tube and burner assembly completely accessible.

C. Boiler tube access panel. Constructed of high temperature insulation board in steel framework.

D. Boiler frame insulated with high temperature insulation.

E. Water leg downcomers to insure rapid internal circulation and temperature equalization.

F. Bryan bent water tubes, flexible, easily replaceable, requiring no welding or rolling, Tubes installed from one side.

G. All controls factory installed and wired.

H. Boiler jacket, heavy zinc coated, rust resistant primer and attractive enamel, Heavy fiberglass insulation for cool surface.

I. Gas burner–atmospheric. Quiet ignition and operation. No moving parts or complicated adjustments.

Listed by Underwriters' Laboratories. Available with U.L. label upon request.

Bryan Steam Corporation guarantees the boiler pressure vessel for twenty years after date of installation against thermal shock. All boilers are built in accordance with the retirements of the ASME Boiler and Pressure Vessel Code, Boilers not approved for installation on combustible floors.

Boiler Model	K-250	K-300	K-350	K-400	K-450	K-500	K-550	K-600	K-650
Input MBH	2500	3000	3500	4000	4500	5000	5500	6000	6500
Output MBH	2000	2400	2800	3200	3600	4000	4400	4800	5200
Boiler Horsepower	60	72	84	96	108	120	131	143	155

Dimensions and specifications are subject to change without notice. Consult factory for certified dimensions.

BRYAN BOILERS

Bryan Steam Corporation — Since 1916
P.O.Box 27, Peru, Indiana 46970-0027 U.S.A.
Phone: 765-473-6651 • Internet: www.bryanboilers.com
Fax: 765-473-3074 • E-mail: bryanboilers@iquest.net

Form No. 5000-4

Printed in USA
73-5500

Marley UPDATE™ Version 4.3.2
Product Data: 2/2/2005

3/18/2005 11:27:40 PM

Job Information

MCCCH
JB
Rockville, MD

Selected By

Penn State
104 Engineering Unit A
University Park, PA
wpb5@psu.edu

PSUAE
Tel 814-863-2076

Marley Contact

H & H Associates, Inc.
4510 Westport Drive
Mechanicsburg, PA 17055
frank@hhassociates.com

Tel 717-796-2401
Fax 717-796-9717

Cooling Tower Definition

Manufacturer	Marley Cooling Technologies	Fan Motor Speed	1200 rpm
Product	NC Class	Fan Motor Capacity per cell	7.500 BHp
Model	NC8307CL1	Fan Motor Output per cell	7.500 BHp
Cells	1	Fan Motor Output total	7.500 BHp
CTI Certified	Yes	Air Flow per cell	97040 cfm
Fan	10.00 ft, 6 Blades	Air Flow total	97040 cfm
Fan Speed	180 rpm, 5654.9 fpm	ASHRAE 90.1 Performance	169 gpm/Hp
Fans per cell	1		

Sound Pressure Level 66 dBA/Cell, 5.00 ft from Air Inlet Face. See sound report for details.

Conditions

Tower Water Flow	900.0 gpm	Air Density In	0.07094 lb/ft³
Hot Water Temperature	95.00 °F	Air Density Out	0.07120 lb/ft³
Range	10.00 °F	Humidity Ratio In	0.01712
Cold Water Temperature	85.00 °F	Humidity Ratio Out	0.02916
Approach	7.00 °F	Wet-Bulb Temp. Out	87.96 °F
Wet-Bulb Temperature	78.00 °F	Estimated Evaporation	9.7 gpm
Relative Humidity	50 %		

- This selection meets your design conditions.

Weights & Dimensions

	Per Cell	Total
Shipping Weight	11270 lb	11270 lb
Max Operating Weight	26330 lb	26330 lb
Width	22.42 ft	22.42 ft
Length	11.90 ft	11.90 ft
Height	13.31 ft	
Static Lift	12.57 ft	

Minimum Enclosure Clearance

Clearance required on air inlet sides of tower without altering performance. Assumes no air from below tower.

Solid Wall	4.36 ft
50 % Open Wall	3.00 ft

Weights and dimensions do not include options; refer to sales drawings. For CAD layouts refer to file NC8307.dxf

Cold Weather Operation

Heater Sizing (Minimum ambient temperature to maintain collection basin water at 40 °F)

Heater kW/Cell	24.0	18.0	15.0	12.0	9.0	7.5	6.0
Ambient Temperature °F	-17.30	-1.86	5.85	13.57	21.28	25.14	29.00

PUMP DETAILS

80 6X6X9-1/2

Flow Rate (GPM)	900	Pump Head (Feet)	50
Speed (RPM)	1750	NPSHr (Feet)	12.5
Weight (lbs)	**	Cost Index	**
Suction Size (in.)	6	Suction Velocity (fps)	10.0
Discharge Size (in.)	6	Discharge Velocity (fps)	10.0
Impeller Size (in.)	8.5	Pump Efficiency (%)	78.28
Max. Flow (GPM)	1203	Duty Flow/Max Flow (%)	74.8
Flow @ BEP (GPM)	841	Min. Rec. Flow (GPM)	210.4
Selected Motor Size (HP)	15	Selected Motor Size (kw)	11.19
Duty-Point Power (BHP)	14.59	Duty-Point Power (kw)	10.88
Maximum Power (BHP)	15.03	Maximum Power (kw)	11.21
Est. Full Load Amps	**	Est. Full Load Efficiency (%)	**
Frame Size	**	Est. Full Load Power Factor (%)	**

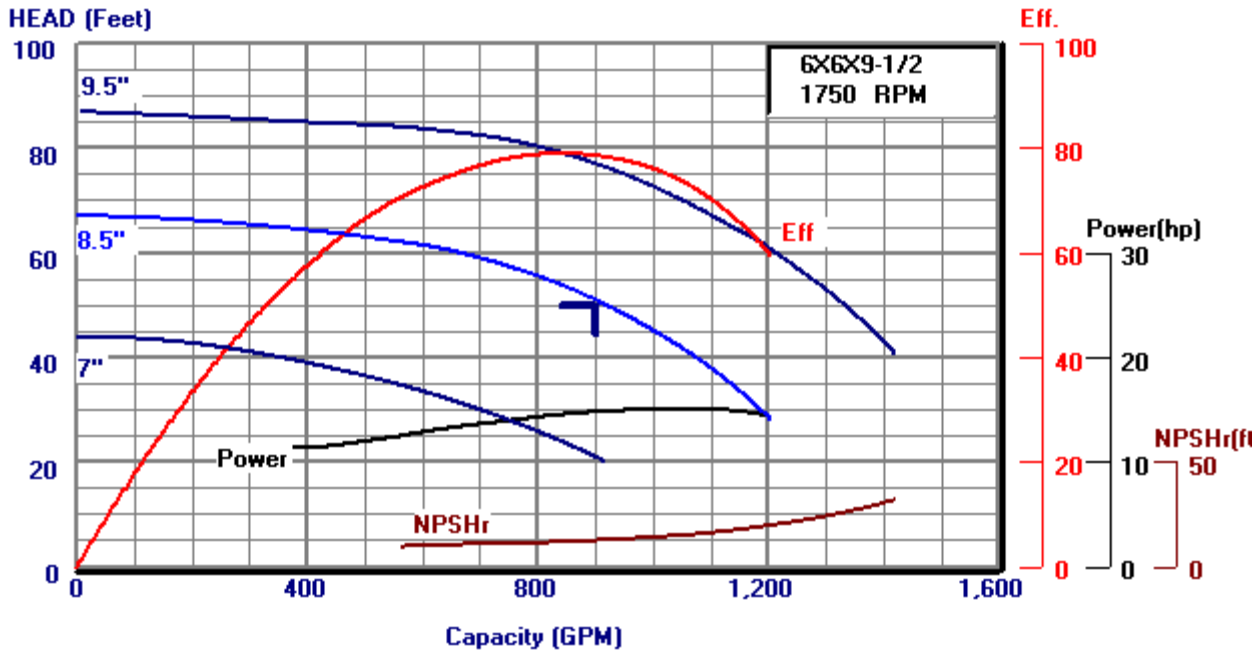
View Published Pump Curve

Download CAD Drawing

Generate Pump Curve
Calculate Operating Costs
Generate Submittal

Print Friendly Format
eMail This Pump Selection
Add This Pump To My Project

Select Feature



Pump Series: 80	Min Imp Dia = 7 "	Design Capacity =900.0	ITT Bell & Gossett
Suction Size = 6 "	Max Imp Dia = 9.5 "	Design Head =50.0	8200 N. Austin
Discharge Size = 6 "	Cut Dia = 8.5 "	Motor Size =15 HP	Morton Grove, Il 60053

The Power and Eff. curves shown are for the cut dia. impeller.