

NASA Buildings 30M, 30A, and 46**Submittal Cover**

Submittal No. 9	Date: 10/24/2011
Product Submitted Bldg. 30A Aurora Pumps	
Manufacturer Aurora	
Spec Section 23.64.26	Spec Title CHW Piping Systems

Product Supplier

Company Delta T Equipment		
Address 8850 Jameel, Suite 100		
City, State Zip Houston, TX 77040		
Contact: Paul McCarver	Phone: 281-745-9060	Fax

Architect

Name HOK		
Address 2800 Post Oak Blvd. Suite 3700		
City, State Zip Houston, TX 77056		
Proj. No. #REF!	Phone: 713-407-7700	Fax 713-407-7809

Engineer

Name HOK		
Address 2800 Post Oak Blvd. Suite 3700		
City, State Zip Houston, TX 77056		
Proj. No. #REF!	Phone: 713-407-7700	Fax 713-407-7809

General Contractor

Name McDonald Electric		
Address 5044 Timber Creek Dr.		
City, State Zip Houston, TX 77017		
Proj. No. #REF!	Phone: 713-921-1368	Fax 713-921-5109

Subcontractor

Name Polk Mechanical Company		
Address 5940 Bingle Rd		
City, State Zip Houston, Texas 77092		
Proj. No. 31-0682-2	Phone: (713) 395-4700	Fax (713) 939-1725

Subcontractor Certification of Compliance:

I hereby certify that the product data contained in this submittal package has been reviewed for compliance with the intent of the Contract Documents and coordinated with the project requirements.

By: _____ Date: _____

General Contractor Review Stamp

Architect Review Stamp

Engineer Review Stamp

Notes/Comments:

TRANSMITTAL OF SHOP DRAWINGS, EQUIPMENT DATA, MATERIAL SAMPLES, OR MANUFACTURER'S CERTIFICATES OF COMPLIANCE FOR APPROVAL (Read instructions on the reverse side prior to initiating this form)										DATE:		<input checked="" type="checkbox"/> NEW SUBMITTAL <input type="checkbox"/> RESUBMITTAL	
L. REQUEST FOR APPROVAL OF THE FOLLOWING ITEMS (This section will be initiated by the contractor)										CONTRACT NUMBER: NNJ 11JB41T			
TO: NASA Johnson Space Center Mail Code EN4 Houston, TX. 77058 Attn: Mr. Craig Rhodes										FROM: C. F. McDonald Electric, Inc 5044 Timber Creek Texas 77017			
SPECIFICATION SECTION NUMBER 23.64.26 (Cover only one section with each transmittal)										TRANSMITTAL NUMBER 23.64.26			
PROJECT TITLE AND LOCATION Replace Air Handler Units in Building 30A, 30M, 46										PREVIOUS TASKS NO. (If any)			
ITEM NO.	DESCRIPTION OF ITEM SUBMITTED (Type, size, model number, etc.)	VARIANCE REQUESTED (Check Box)	DESCRIPTION OF SUPPORTING DATA	NUMBER OF COPIES	PARAGRAPH NUMBER OF NASA SPECIFICATION	NASA DRAWING SHEET PLATE, OR FILE NO. (If applicable)	FOR NASA USE ONLY ACTION CODE						
1	HVAC Pumps 30A-1 & 30A-2	N/A	1.3	5	SD-03								
2	Pumps	N/A	2.6	5	2.6								
3	Construction	N/A	2.6	5	2.6.1								
4	Mechanical Shaft Seals	N/A	2.6	5	2.6.2								
5	Painting of New Equipment	N/A	2.7	5	2.7								
6	Factory Painting Systems	N/A	2.7	5	2.7.1								
7	Nameplates	N/A	2.8	5	2.8								
8													
9													
10													
11													
12													
13													
14													
DISTRIBUTION REQUESTED (ATTACH ADDITIONAL SHEET, IF NECESSARY) Please return (2) two copies after review.								I certify the above submittal items have been reviewed in detail and are correct and in strict compliance with the drawings. (SIGNATURE OF CONTRACTOR)					
McDonald Electric, William Udick													
11. (This section will be used by the approving authority only) ACTION CODES: The following action codes are given to items submitted: (A code letter will be inserted for each item in Action Code Column, above)													
A. Approved as submitted.													
B. Approved, except as noted on drawings. Resubmission not required.													
C. Disapproved. See attached sheet.													
D. Acknowledge receipt.													
NOTE: Approval of items does not relieve the contractor from complying with all the requirements of the contract plans and specifications.													
ENCLOSURES RETURNED (Date by item number)													
NAME, TITLE & SIGNATURE OF APPROVING AUTHORITY													
DATE													



8850 Jameel, Suite 100 Houston, TX 77040 (281) 745-9060 Fax (281) 745-9064

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Project: NASA B-30A

Equipment: HVAC Pumps

Manufacturer: Aurora

Mechanical Contractor: Polk Mechanical

Representative: Paul McCarver

Date: October 3, 2011

Delta T Job Number: TBD

CP AURORA
Pneumatic Pumps

SyndroFlo

ASP
ADVANCED
SUPPORT PRODUCTS

Hyspan

TOSHIBA

MILJOCO
CORPORATION

camfil
F. F. F. F.

M
I
MASON INDUSTRIES
WATER PUMPING EQUIPMENT

SQUARE D

CONCRETE

HP HYDROMATIC

UV

UV

AMERICAN WHEATLEY
PUMP PRODUCTS

2.5.3 Pressure and Vacuum Gauges

Gauges, ASME B40.100 with throttling type needle valve or a pulsation dampener and shut-off valve. Provide gauges with 4.5 inch dial, brass or aluminum case, bronze tube, and siphon. Gauge shall have a minimum of with a range from 0 psig to approximately 1.5 times the maximum system working pressure. Each gauge range shall be selected so that at normal operating pressure, the needle is within the middle-third of the range.

2.5.4 Temperature Gauges

Temperature gauges shall be the industrial duty type and be provided for the required temperature range. Provide gauges with fixed thread connection, dial face gasketed within the case, and an accuracy within 2 percent of scale range. Gauges shall have Fahrenheit scale in 2 degree graduations scale (black numbers) on a white face. The pointer shall be adjustable. Rigid stem type temperature gauges shall be provided in thermal wells located within 5 feet of the finished floor. Universal adjustable angle type or remote element type temperature gauges shall be provided in thermal wells located 5 to 7 feet above the finished floor or in locations indicated. Remote element type temperature gauges shall be provided in thermal wells located 7 feet above the finished floor or in locations indicated.

2.5.4.1 Bimetallic Dial

Bimetallic dial type case shall be not less than 3-1/2 inches, stainless steel, and shall be hermetically sealed with clear acrylic lens. Bimetallic element shall be silicone dampened and unit fitted with external calibrator adjustment.

2.5.4.2 Thermal Well

Thermal well shall be identical size, 1/2 or 3/4 inch NPT connection, brass or stainless steel. Where test wells are indicated, provide captive plug-fitted type 1/2 inch NPT connection suitable for use with either engraved stem or standard separable socket thermometer or thermostat. Mercury shall not be used in thermometers. Extended neck thermal wells shall be of sufficient length to clear insulation thickness by 1 inch.

2.5.5 Pipe Hangers, Inserts, and Supports

Pipe hangers, inserts, guides, and supports: to MSS SP-58 and MSS SP-69.

2.6 PUMPS

Pumps shall be the electrically driven, non-overloading, centrifugal type which conform to HI 1.1-1.5. Pumps shall be selected at or within 5 percent of peak efficiency. Pump curve shall rise continuously from maximum capacity to shutoff. Pump motor shall conform to NEMA MG 1, be open or totally enclosed, and have sufficient horsepower for the service required. Pump motor shall have the required capacity to prevent overloading with pump operating at any point on its characteristic curve. Pump speed shall not exceed 3,600 rpm, except where the pump head is less than 60 feet of water, the pump speed shall not exceed 1,750 rpm.

2.6.1 Construction

Each pump casing shall be designed to withstand the discharge head

COMPLY

specified plus the static head on system plus 50 percent of the total, but not less than 125 psig. Pump casing and bearing housing shall be close grained cast iron. High points in the casing shall be provided with manual air vents; low points shall be provided with drain plugs. Provide threaded suction and discharge pressure gage tapping with square-head plugs.

Impeller shall be statically and dynamically balanced. Impeller, impeller wearing rings, glands, casing wear rings, and shaft sleeve shall be bronze. Shaft shall be carbon or alloy steel, turned and ground. Bearings shall be ball-bearings, roller-bearings, or oil-lubricated bronze-sleeve type bearings, and be efficiently sealed or isolated to prevent loss of oil or entrance of dirt or water.

Pump and motor shall be mounted on a common cast iron base having lipped edges and tapped drainage openings or structural steel base with lipped edges or drain pan and tapped drainage openings. Pump shall be provided with steel shaft coupling guard. Base-mounted pump, coupling guard, and motor shall each be bolted to a fabricated steel base which shall have bolt holes for securing base to supporting surface. Pump shall be accessible for servicing without disturbing piping connections. Shaft seals shall be mechanical-seals or stuffing-box type.

2.6.2 Mechanical Shaft Seals

Seals shall be single, inside mounted, end-face-elastomer bellows type with stainless steel spring, brass or stainless steel seal head, carbon rotating face, and tungsten carbide or ceramic sealing face. Glands shall be bronze and of the water-flush design to provide lubrication flush across the face of the seal. Bypass line from pump discharge to flush connection in gland shall be provided, with filter or cyclone particle separator in line.

2.7 PAINTING OF NEW EQUIPMENT

New equipment painting shall be factory applied or shop applied, and shall be as specified herein, and provided under each individual section.

2.7.1 Factory Painting Systems

Manufacturer's standard factory painting systems may be provided. The factory painting system applied will withstand 125 hours in a salt-spray fog test, except that equipment located outdoors shall withstand 500 hours in a salt-spray fog test.

Salt-spray fog test shall be in accordance with ASTM B 117, and for that test, the acceptance criteria shall be as follows: immediately after completion of the test, the paint shall show no signs of blistering, wrinkling, or cracking, and no loss of adhesion; and the specimen shall show no signs of rust creepage beyond 0.125 inch on either side of the scratch mark. The film thickness of the factory painting system applied on the equipment shall not be less than the film thickness used on the test specimen.

If manufacturer's standard factory painting system is being proposed for use on surfaces subject to temperatures above 120 degrees F, the factory painting system shall be designed for the temperature service.

2.8 NAMEPLATES

Major equipment including pumps and pump motors, shall have the

COMPLY-

manufacturer's name, type or style, model or serial number on a plate secured to the item of equipment. The nameplate of the distributing agent will not be acceptable. Plates shall be durable and legible throughout equipment life and made of anodized aluminum or stainless steel. Plates shall be fixed in prominent locations with nonferrous screws or bolts.

2.9 RELATED COMPONENTS/SERVICES

2.9.1 Field Applied Insulation

Requirements for field applied insulation is specified in Section 23 07 00 THERMAL INSULATION FOR MECHANICAL SYSTEMS.

PART 3 EXECUTION

3.1 INSTALLATION

Cut pipe accurately to measurements established at the jobsite, and work into place without springing or forcing, completely clearing all windows, doors, and other openings. Cutting or other weakening of the building structure to facilitate piping installation is not permitted without written approval. Cut pipe or tubing square, remove burrs by reaming, and fashion to permit free expansion and contraction without causing damage to the building structure, pipe, joints, or hangers.

Notify the Contracting Officer in writing at least 15 calendar days prior to the date the connections are required. Obtain approval before interrupting service. Furnish materials required to make connections into existing systems and perform excavating, backfilling, compacting, and other incidental labor as required. Furnish labor and tools for making actual connections to existing systems.

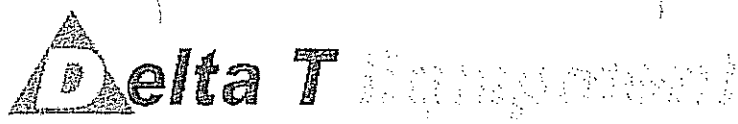
3.1.1 Welding

Provide welding work specified this section for piping systems in conformance with ASME B31.9, as modified and supplemented by this specification section and the accompanying drawings. The welding work includes: qualification of welding procedures, welders, welding operators, brazers, brazing operators, and nondestructive examination personnel; maintenance of welding records, and examination methods for welds.

3.1.1.1 Employer's Record Documents (For Welding)

Submit for review and approval the following documentation. This documentation and the subject qualifications shall be in compliance with ASME B31.9.

- a. List of qualified welding procedures that is proposed to be used to provide the work specified in this specification section.
- b. List of qualified welders, brazers, welding operators, and brazing operators that are proposed to be used to provide the work specified in this specification section.
- c. List of qualified weld examination personnel that are proposed to be used to provide the work specified in this specification section.



HVAC Pumps

Qty. 2 Aurora Type 411, Model 5x6x15, bronze fitted, single stage, double suction, horizontal split case centrifugal pump sized for 1275 gpm @ 116' tdl. Each pump shall be furnished with John Crane Type 21 mechanical seals, bronze case wear rings, stainless steel shaft mounted on a structural steel base. The suction and discharge flanges shall be 125# ANSI. Each pump is direct connected through flexible Woods coupling with OSHA approved coupling guard to a 60HP, 3 phase, 230/460 volt, 60 hertz, 1750 rpm, ODP premium efficient motor.

Regards,

A handwritten signature in black ink, appearing to read 'Paul McCarver'.

Paul McCarver

AURORA
PUMP & MOTOR

SyncoFlo

ASP
ADVANCED
SUPPORT PRODUCTS

Hyspan

TOSHIBA

MILJOCO
CORPORATION

camfil
F. 12.14.19.12

MASCO INDUSTRIES
PUMP AND MOTOR SPECIALISTS

SQUARE D

WATTS

HYDRAMATIC

UV

AMERICAN WHEATLEY
PUMP PRODUCTS

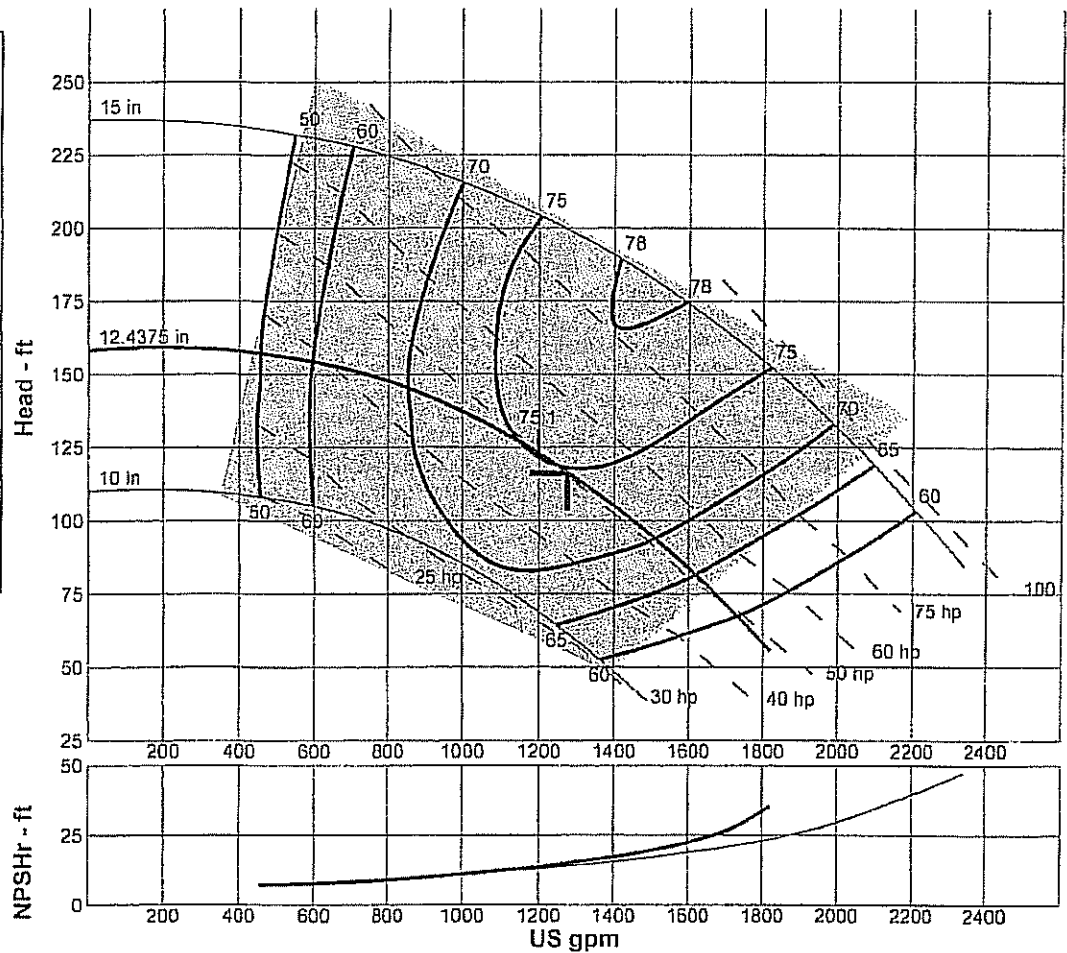
Company: delta t
Name:
Date: 10/3/2011



Pump			Search Criteria	
Size: 5x6x15			Flow: 1275 US gpm	Head: 116 ft
Type: 410 1 STG SPLIT CASE	Speed: 1775 rpm		Fluid	
Synch speed: 1800 rpm	Dia: 12.4375 in		Water	Temperature: 60 °F
Curve: 2PC-117379A	Impeller: 444V328		Density: 62.25 lb/ft³	Vapor pressure: 0.2563 psi a
Specific Speeds:	Ns: 977		Viscosity: 1.105 cP	Atm pressure: 14.7 psi a
	Nss: 5783		NPSHr: ---	
Dimensions:	Suction: 6 in		Motor	
	Discharge: 5 in		Standard: NEMA	Size: 60 hp
			Enclosure: TEFC	Speed: 1800
				Frame: 364T

Pump Limits			Sizing criteria: Max Power on Design Curve	
Temperature: 275 °F	Power: ---			
Pressure: 250 psi g	Eye area: ---			
Sphere size: 0.813 in				

Data Point	
Flow:	1275 US gpm
Head:	116 ft
Eff:	74%
Power:	50 hp
NPSHr:	15 ft
Design Curve	
Shutoff head:	158 ft
Shutoff dP:	68.4 psi
Min flow:	---
BEP:	75% @ 1198 US gpm
NOL power:	51.3 hp @ 1618 US gpm
Max Curve	
Max power:	96.9 hp @ 2096 US gpm

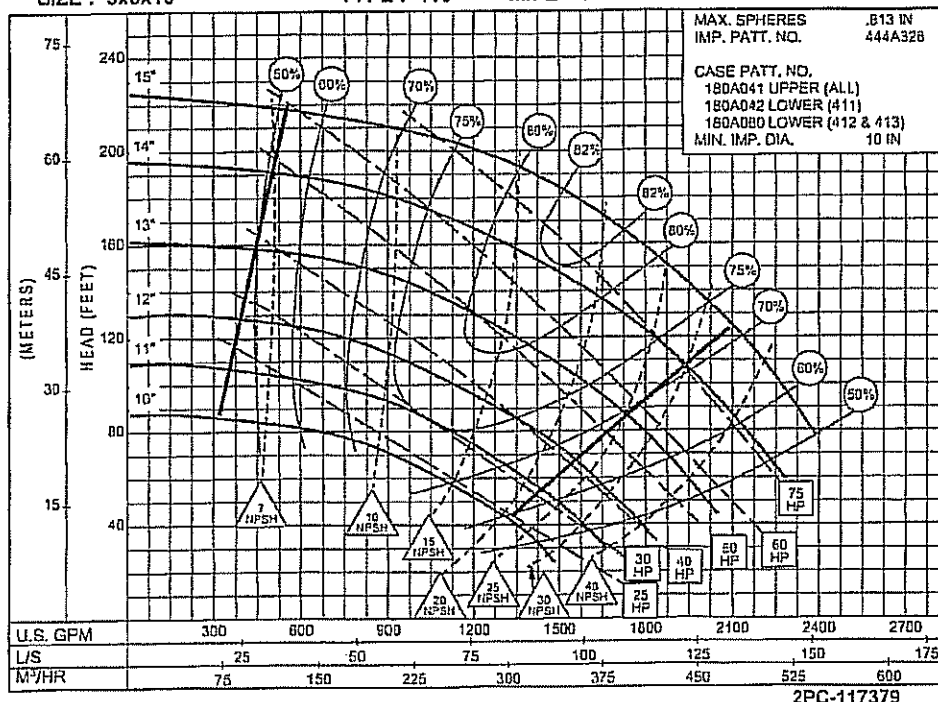


Performance Evaluation						
Flow	Speed	Head	Efficiency	Power	NPSHr	
US gpm	rpm	ft	%	hp	ft	
1530	1775	91.4	69	51.1	20.4	
1275	1775	116	74	50	15	
1020	1775	135	73	47.2	11.4	
765	1775	148	67	42.6	8.84	
510	1775	156	54	37.1	7.32	

Section **410** Page **416**
 Date **January 2001**
 Supersedes Section 410 Page 416
 Dated June 1989

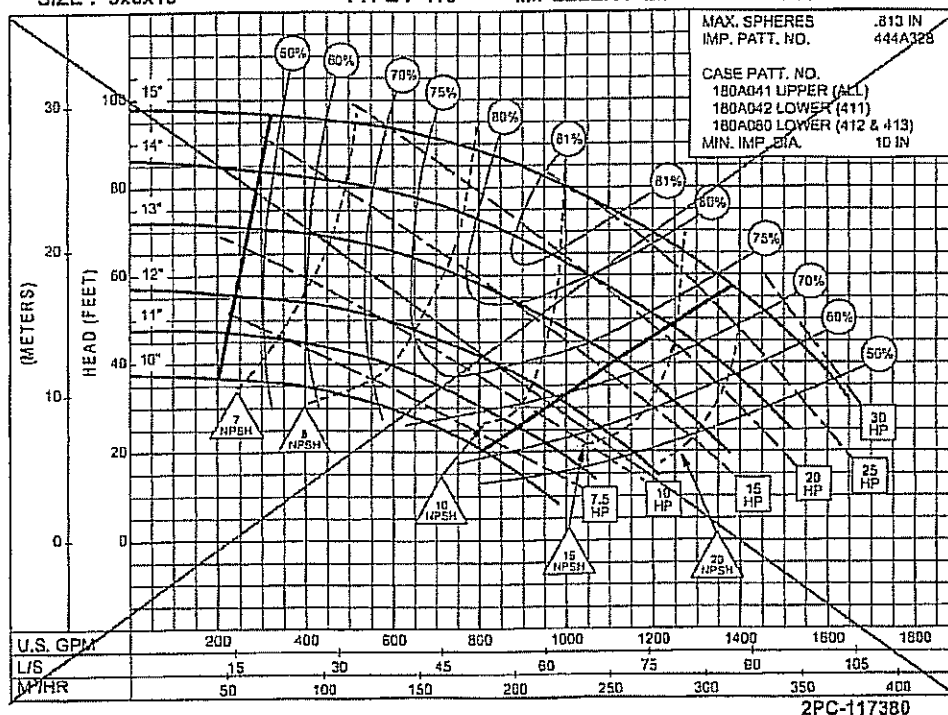
5 x 6 x 15
SERIES 410
 ENCLOSED IMPELLER

SIZE : 5x6x15 TYPE : 410 IMPELLER : Enclosed R. P. M. : 1750



1750
 RPM

SIZE : 5x6x15 TYPE : 410 IMPELLER : Enclosed R. P. M. : 1150



1150
 RPM

Date FEBRUARY 1999

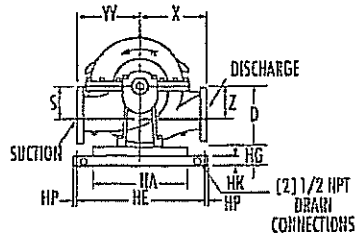
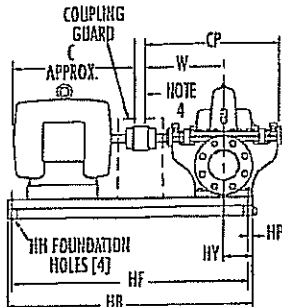
Supersedes Section 410 Page 302
Dated JULY 1998

AURORA MODEL 411 PUMPS

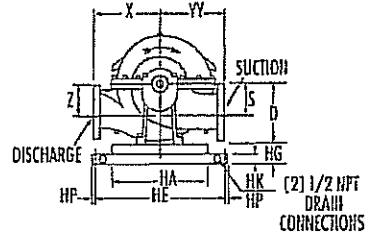
ON STEEL DRIP RIM BASE

4"-5"-6"-8" PUMPS

POWER SERIES NO. 4-5



RIGHT HAND ROTATION



LEFT HAND ROTATION

BASE	SIZE	HA	HB	HE	HF	HD	HH	HK	HP
6	11 x 42	11 (279)	42-1/2 (1080)	15-7/8 (403)	41-1/8 (1045)	3 (76)	7/8 (22)	1-1/2 (38)	11/16 (18)
9	14 x 48	14 (356)	48-1/2 (1232)	19 (483)	47 (1194)	4 (76)	1 (25)	1-1/2 (38)	3/4 (19)
11	18 x 46	18 (457)	46-1/2 (1181)	25-1/8 (638)	44-7/8 (1140)	4 (102)	1-1/8 (29)	2 (51)	13/16 (21)
12	18 x 54	18 (457)	54-1/2 (1384)	25-1/8 (638)	52-7/8 (1343)	4 (102)	1-1/8 (29)	2 (51)	13/16 (21)
13	18 x 64	18 (457)	64-1/2 (1638)	25-1/8 (638)	62-7/8 (1597)	4 (102)	1-1/8 (29)	2 (51)	13/16 (21)
15	22 x 54	22 (559)	54-1/2 (1384)	29-1/8 (740)	52-7/8 (1343)	4-1/2 (114)	1-1/8 (29)	2 (51)	13/16 (21)
16	22 x 64	22 (559)	64-1/2 (1638)	29-1/8 (740)	62-7/8 (1597)	4-1/2 (114)	1-1/8 (29)	2 (51)	13/16 (21)
17	22 x 74	22 (559)	74-1/2 (1892)	29-1/8 (740)	72-7/8 (1851)	4-1/2 (114)	1-1/8 (29)	2 (51)	13/16 (21)
18	22 x 82	22 (559)	82-1/2 (2096)	29-1/8 (740)	80-7/8 (2054)	4-1/2 (114)	1-1/8 (29)	2 (51)	13/16 (21)

PUMP SIZE			DISCH	SUCTION	CASE BORE	D	S	W	X	Z	CP	HY	YY
DISCH	SUCTION	CASE BORE											
4	6	18B	4	12-1/2 (318)	6-1/4 (159)	16 (403)	14 (356)	6-1/4 (159)	28-1/2 (734)	6-1/2 (165)	16 (403)		
5	6	11A & C		11-1/2 (279**)	5-1/2 (140)		13-1/4 (286)	5-1/2 (140)		13-1/4 (337)			
5	6	15		12-1/2 (318)	6-1/4 (159)		13-1/4 (337)	6-1/4 (159)		15 (381)			
5	6	17		12-1/2 (318)	6-1/4 (159)		14 (356)	6-1/4 (159)		15 (381)			
6	8	11		12-1/2 (318)	6-1/4 (159)		11-3/4 (298)	6-1/4 (159)		14-1/2 (368)			
6	8	11B		12-1/2 (318)	6-1/4 (159)		12 (305)	6-1/4 (159)		14-1/2 (368)			
6	8	15	5	13-1/2 (343)	6-3/4 (171)	18 (457)	14-1/4 (362)	6-3/4 (171)	32 (813)	7-1/2 (191)	16-3/4 (425)		
6	8	18A, B & C		14-3/4 (375)	8 (203)		16 (406)	8 (203)		18 (457)			
6	8	20		14-3/4 (375)	8 (203)		15-3/4 (400)	8 (203)		18 (457)			
8	10	12 & 12A		14-3/4 (375)	8 (203)		17 (432)	9 (229)		17-3/4 (451)			
8	10	15A & B		14-3/4 (375)	8 (203)		17 (432)	9 (229)		17-3/4 (451)			
8	10	17B		14-3/4 (375)	8 (203)		17 (432)	9 (203)		17-3/4 (451)			

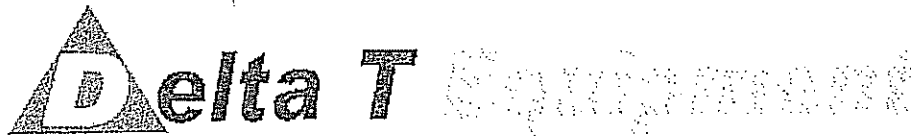
PUMP SIZE		FRAME	213T	215T	254T	256T	284TS	284T	286TS	286T	324TS	324T	326TS	326T	364TS	364T	365TS	365T	404TS	404T	405TS	405T	444TS	444T	445TS	445T	447TS	447T	449TS	449T		
DISCH	SUCT	CASE BORE	C	16 (408)	18 (457)	21 (533)	23 (584)	22 (559)	24 (610)	24 (616)	25 (635)	25 (635)	26 (660)	26 (660)	28 (711)	27 (688)	29 (737)	28 (711)	30 (762)	30 (762)	33 (833)	31 (787)	35 (889)	34 (864)	38 (965)	36 (914)	40 (1016)	40 (1016)	44 (1118)	45 (1143)	49 (1249)	
4	6	36B	BASE	6	9	11	11	12	13	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	
5	6	11A & C	BASE																													
5	6	15	BASE																													
5	6	17	BASE																													
6	8	11	BASE																													
8	8	11B	BASE	9	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37		
6	8	15	BASE																													
6	8	18A, B & C	BASE																													
6	8	20	BASE																													
8	10	12 & 12A	BASE																													
8	10	15A & B	BASE	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45
8	10	17B	BASE																													

NOTES:

- All dimensions in inches (mm).
- Dimensions may vary $\pm 3/8"$ (10).
- Not for construction purposes unless certified.
- Coupling gap may vary 1/8" (3) to 2-1/16" (52).
- Conduit box is shown in approximate location. Dimensions are not specified as they vary with each motor manufacturer.

- Discharge and suction flanges - ANSI Standard flat face.
- Dimension "D" is 12" (305) when using frames 405TS-449T.
- Dimension "D" is 14-1/2" (368) when using frames 404TS thru 449T.

STD. 125# FLANGES	OPT. 250# FLANGES
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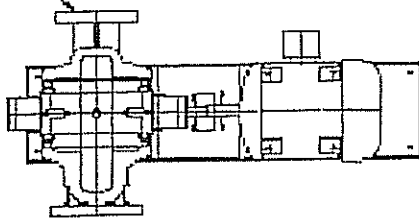
8850 Jameel, Suite 100 Houston, TX 77040 (281) 745-9060 Fax (281) 745-9064

HORIZONTAL SPLIT CASE PUMP ROTATION VERIFICATION

Job Name: _____ Pump Tag: _____

*Check either clockwise or counterclockwise rotation
for the installation noted above and sign below.*

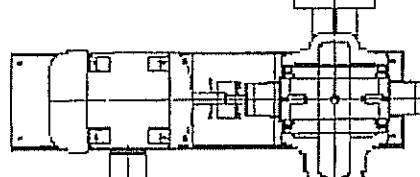
Discharge



Suction

Plan View Left Hand
Counterclockwise (CCW)

Discharge



Suction

Plan View Right Hand
Clockwise (CW)

Signature _____

Printed Name _____

Company _____

AP AURORA
PUMP WORK

SyncoFlo



Hyspan

FILTRATION GROUP

MILJOCO
CORPORATION

TOSHIBA

MASON INDUSTRIES
PUMP & FILTER DIVISION



ASP
ADVANCED
SUPPORT PRODUCTS

UV

SUNBELT PUMP

AMERICAN WHEATLEY
PUMP PRODUCTS