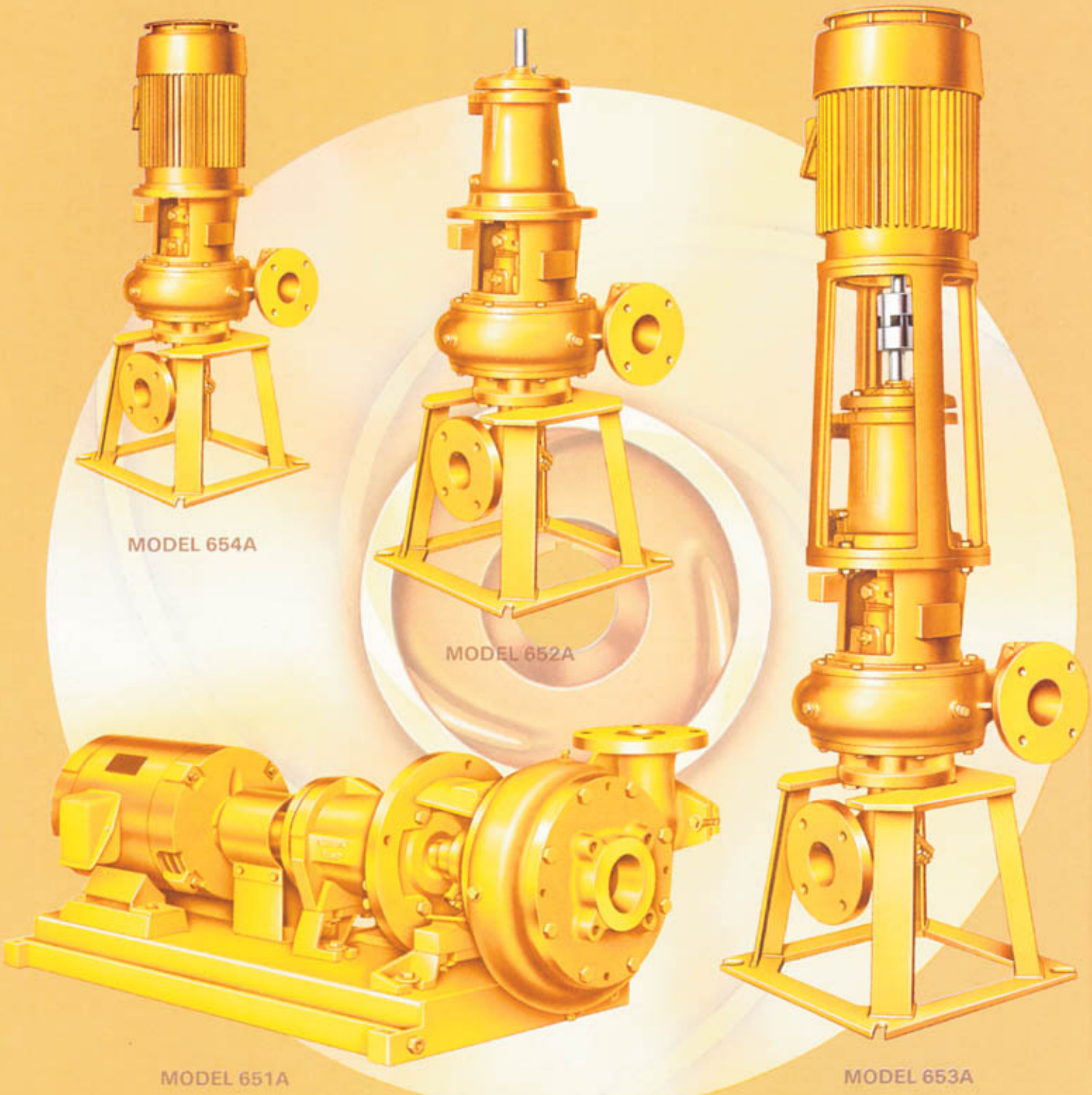
AURORA PUMP A member of PENTAIR PUMP GROUP

AURORA PUMP

BULLETIN 650A/Rev. F

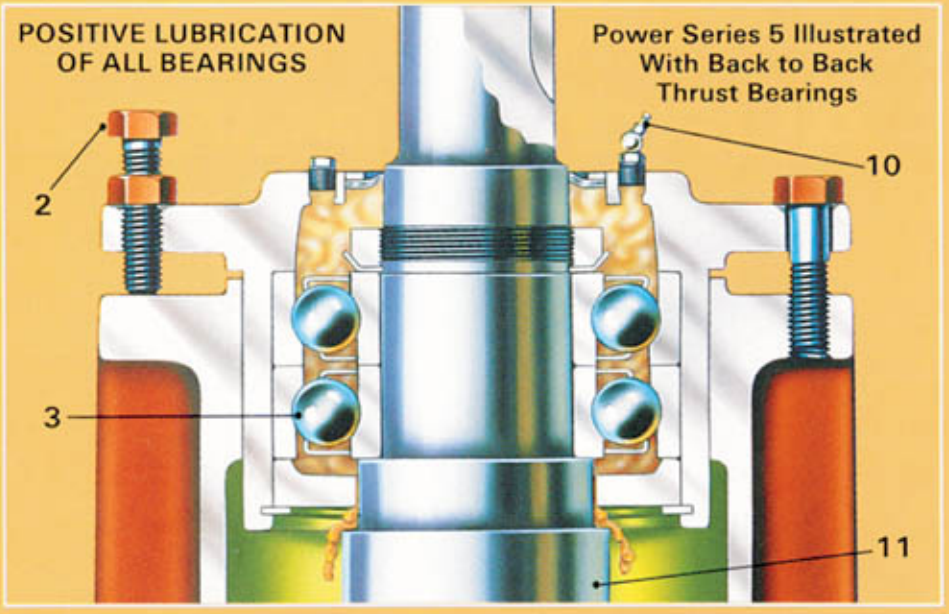
650 SERIES SINGLE STAGE NON-CLOG PUMPS

CAPACITIES TO 2000 G.P.M.
HEADS TO 240 FEET
TEMPERATURES TO 250°F.
DISCHARGE SIZES 3" AND 4"



INTRODUCTION
NON-CLOG PUMPS

The population explosion along with a broader understanding of the water pollution problem has brought about the need for more and better sewage treatment facilities. The installations of today and tomorrow demand more economical and reliable sewage pumping equipment. Longer life has become essential to pump performance. Aurora Pump recognizes this need, and with this bulletin offers the 650 Series of the medium duty horizontal and vertical pumps as our solution to your pumping problems.



MODELS 651A are horizontally baseplate mounted with a driver flexibly coupled to the pump. This easy to service design is recommended where floor space is readily available or where flooding of the installation is not possible.

MODELS 652A are vertically mounted and utilize flexible shafting between the driver and the pump. This model is frequently used on lift station applications where flooding of the installation is possible. The driver is remote.

MODELS 653A and 654A are vertically mounted with an elevated driver coupled directly to the pump (Model 653A thru a flexible coupling). 653A-654A are popular for installations where floor space is limited and flooding is marginal.

QUICK REFERENCE 650 SERIES FEATURE SELECTOR

STANDARD

- 1-1/2" to 3" sphere capacity
- All iron fitted pump construction
- Regreaseable bearings
- Double row outboard thrust bearing
- Single row inboard radial bearing
- Hardened stainless steel (450 min. Brinell) shaft sleeve (pumps with packing)
- Leakage accumulator packing gland (Model 652A-653A)
- Impeller clearance adjustment
- Taper shaft fit at impeller
- Carbon steel shaft and impeller key
- Front or back impeller pull out
- Non-clog impeller
- Dynamically balanced impeller
- Suction elbow w/hand hole (Model 652A-653A-654A)
- Tangential discharge casing
- Hydrostatic test all pumps
- Interwoven graphite/Teflon lubricated acrylic yarn packing
- Lantern ring
- Discharge position No. 1
- Right hand (cw) pump rotation
- Gasket sealed pump shaft
- Coupling Guard (Model 651A)

OPTIONAL

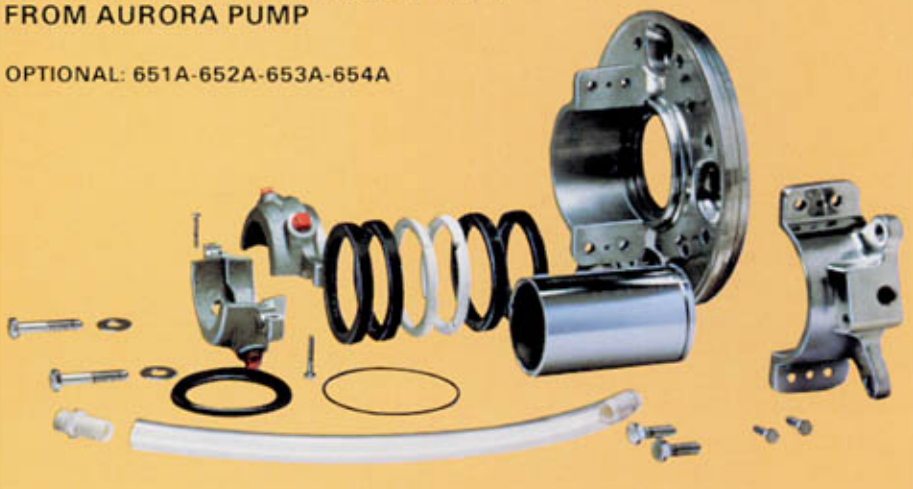
- Removable split packing box
- Stainless steel case wear ring
- Stainless steel impeller wear ring
- Single mechanical seal
- Stainless steel shaft
- External stuffing box piping with filter or valve
- Automatic stuffing box grease seal lubricator
- Spacer type coupling (Model 651A only)
- Flexible shaft drive with or without guard (Model 652A only)
- Water Seal Unit Assembly (See Bulletin 680)
- Constant liquid level system (Apco-Matic Variable Speed — See Bulletin 700)
- Certified test report — witnessed or unwitnessed (clear water)
- Special alloy pump construction
- Alternate discharge positions
- Alloy shaft sleeve (standard with mechanical seal)
- Double mechanical seal (std. 654A)
- Suction increasing elbow with clean out (Models 652A-653A-654A)
- Left hand (ccw) pump rotation

TANGENTIAL DISCHARGE

Optional discharge position illustrated

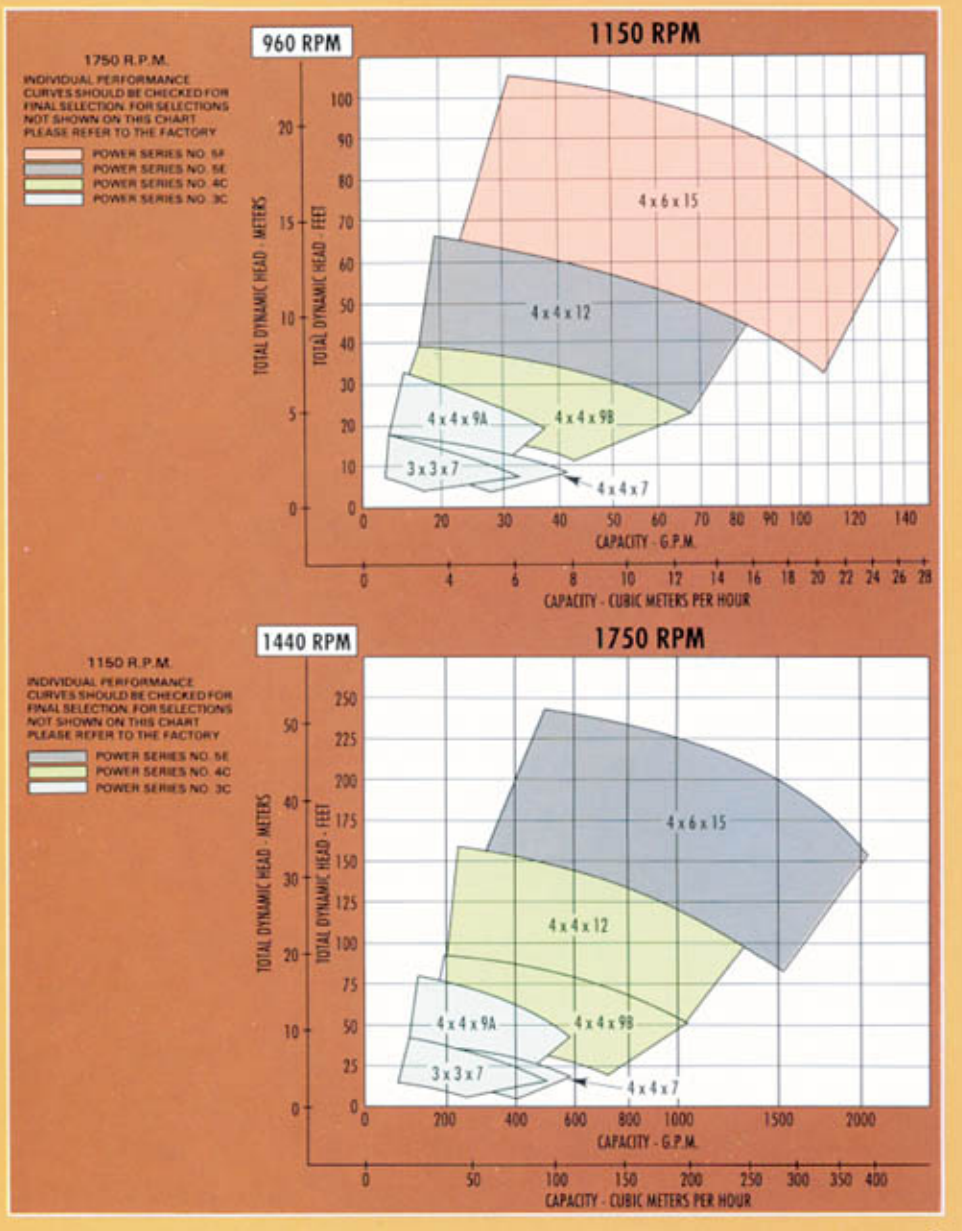
EXCLUSIVE SPLIT PACKING BOX OPTION WITH LEAKAGE ACCUMULATOR IS AVAILABLE *ONLY* FROM AURORA PUMP

OPTIONAL: 651A-652A-653A-654A



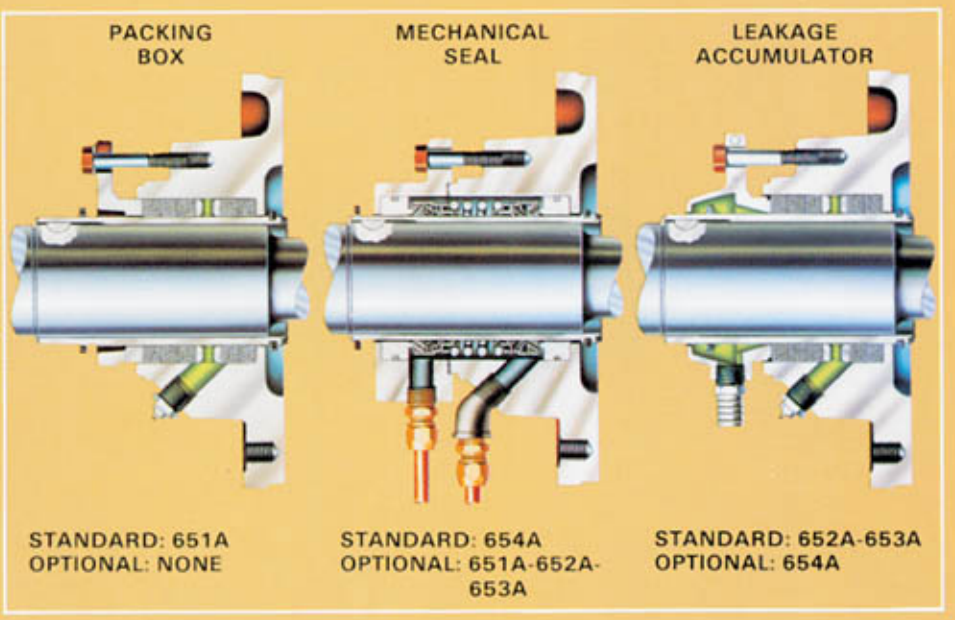
SPECIAL PUMP FEATURES

Efficient tangential discharge. MODELS 651A are horizontally baseplate mounted with a driver flexibly coupled to the pump. SUPPORT of various pump components is important. Inadequate mounting designs impose unnecessary stress and strain on the entire pump and installation. Vibration results. AURORA tangential pumps designed to provide the best available component support. HORIZONTAL 651A UNITS are supported at both pump and coupling end. This, with tangential discharge support, provides protection against pipe strain and maintains casing support when the drive end of the pump is removed for servicing. The rear support foot greatly simplifies coupling alignment and is an important Aurora feature. On VERTICAL 653A UNITS, the steel motor base has a tangential pump registered fit at the motor end and is fastened to a separate pump adapter. This exclusive arrangement assures alignment and concentrates loads on the separate pump adapter eliminating strain and misalignment of the bearing housing. On 652A-653A-654A UNITS the steel base provides a rigid support for the complete pump unit. 654A is close coupled.



OPTIONAL EQUIPMENT AND DIMENSIONS

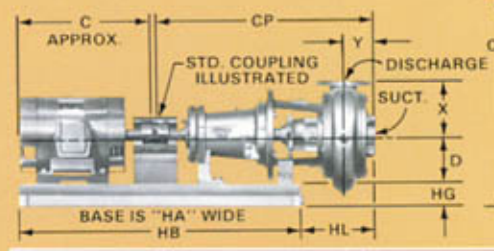
SPLIT PACKING BOXES separate vertically through the packing insert to simplify packing replacement and shaft sleeve inspection. The insert halves are doweled, register aligned and gasketed to prevent leakage. Only six bolts need be removed to disassemble the insert from the pump assembly. DOUBLE MECHANICAL SEALS must be recommended for gritty or abrasive applications. Seal faces are protected by clear water under pressure, injected directly into the seal cavity. The seal box design allows speedy seal maintenance. Single mechanical seals are available. LEAKAGE ACCUMULATOR for vertical pump models with packed stuffing boxes collects seepage for easy drain off. The gland halves are dowel aligned.



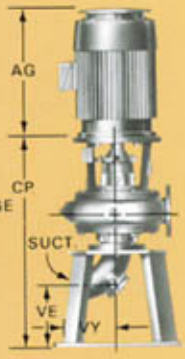
NOTES:

1. Dimensions and weights are approximate.
2. Refer to factory for base dimensions when spacer couplings are specified.
3. Not for construction purposes unless certified.
4. Frame sizes shown are for open drip-proof motors only.
5. Suction and discharge flanges are American Standard 125#.
6. Conduit box is shown in approximate position. Dimensions are not specified as they vary with each motor manufacturer.
7. Add pump, base and motor weight for unit weight.
8. Horizontal motors are "T" frame as shown — Vertical motors are "HP" frame.

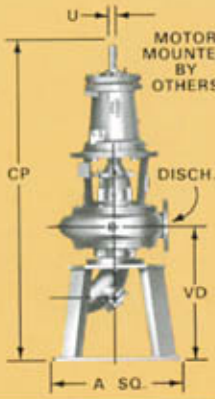
MODEL 651A



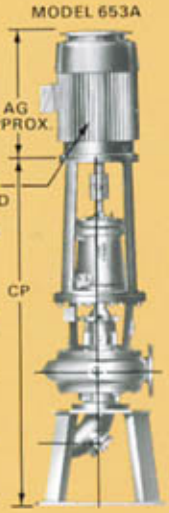
MODEL 654A



MODEL 652A



MODEL 653A



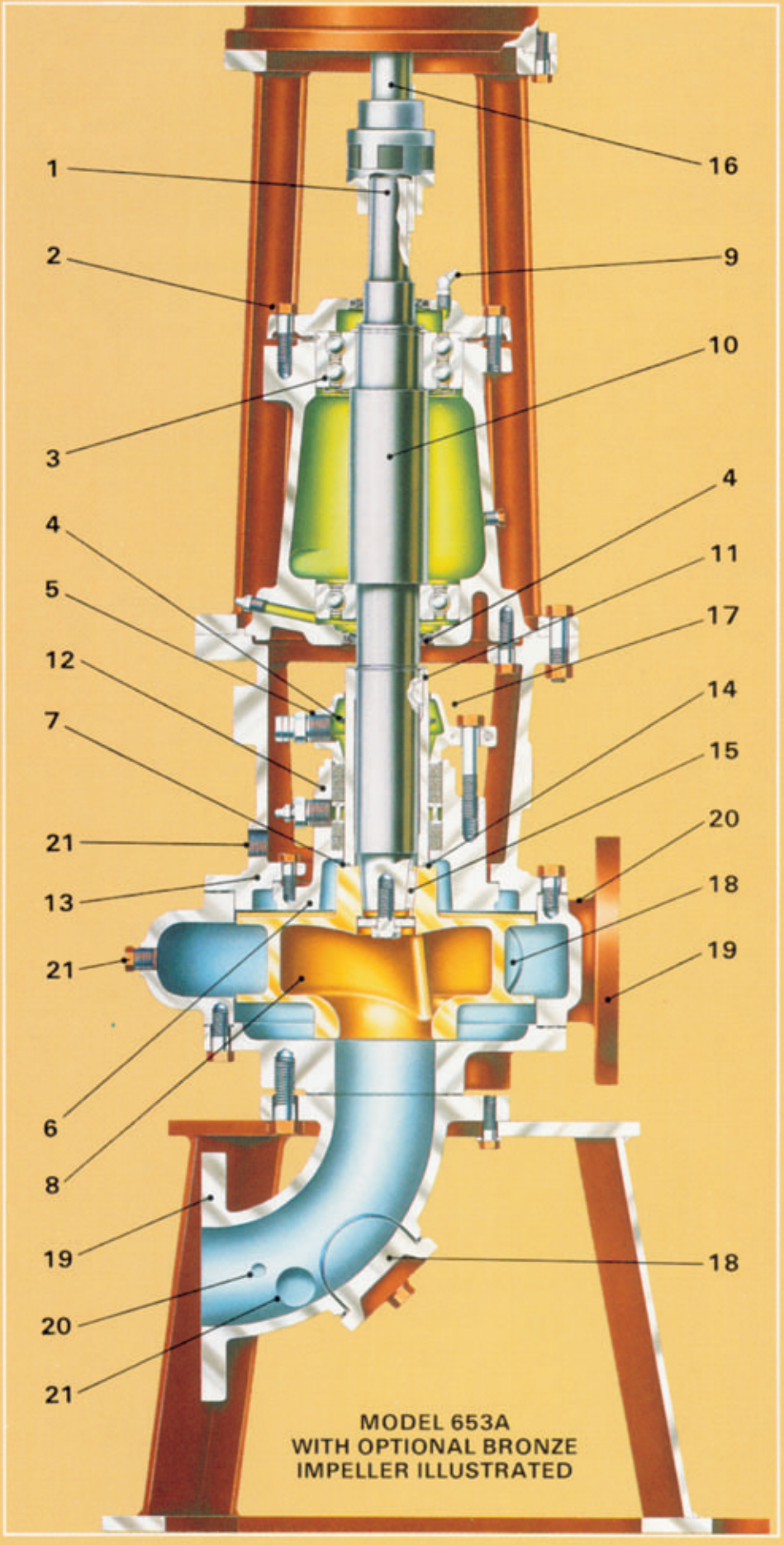
MOTOR FRAME (note 8)	HORSEPOWER RPM 1750	HORSEPOWER RPM 1150	WGT. IN LBS.	C	AG
143T	1	3/4	40	12	11
145T	1-1/2-2	1	45	13	12
182T	3	1-1/2	72	13	13
184T	5	—	85	14	14
213T	7-1/2	—	150	16	16
215T	10	5	190	18	17
254T	15	7-1/2	230	21	19
256T	20	10	250	23	21
284T	25	15	350	24	22
286T	30	20	380	25	23
324T	40	25	475	26	24
326T	50	30	525	28	26
364T	—	40	630	29	25
364TS	60	—	630	27	25
365T	—	50	690	30	25
365TS	75	—	690	28	25
404T	—	60	830	33	28
404TS	100	—	830	30	28
405T	—	75	915	34	28
405TS	125	—	915	31	28
444T	—	100	1000	38	32
444TS	150	—	1000	34	32
445T	—	125	1100	40	32
445TS				36	

651A-652A-653A-654A — DIMENSIONS — PUMP *Add 2" w/Frame 284 HPH or larger

PUMP SIZE DISCH.	SUCT.	CASE	PWR. SER.	PUMP WEIGHT 651A	652A	653A	A	D	U	X	Y	Z	CP 651A	652A	653A	654A	VD	VE	VY
3	3	7	3C	192	257	291	17	6-1/4	1-1/4	6	3	5	26-5/8	39-7/8	43-1/2	26-9/16	16-1/4	7-3/4	5-1/2
3	3	9	3C	238	303	337	17	6-1/4	1-1/4	7	4-1/16	6-1/8	28-3/8	41-5/8	45-1/4	28-5/16	17-5/16	7-3/4	5-1/2
4	4	7	3C	207	293	327	17	6-1/4	1-1/4	7	4-1/2	5-3/8	28-3/8	41-7/8	45-1/2	28-9/16	18	6-15/16	6-1/2
4	4	9A	3C	232	318	351	17	6-1/4	1-1/4	8-1/4	4-1/4	7-1/16	27-1/2	41	44-5/8	27-11/16	17-3/4	6-15/16	6-1/2
4	4	9B	4C	242	328	361	17	11	1-1/4	10	6-3/16	7-7/8	28-7/8	42-3/8	46-1/8	29-3/16	19-11/16	6-15/16	6-1/2
4	4	12	4C	317	402	435	17	13-1/2	1-1/4	10-1/2	6-1/4	9	28-7/8	42-3/8	46-1/8	29-3/16	19-3/4	6-15/16	6-1/2
4	4	12	5E	327	412	445	17	13-1/2	2-3/8	10-1/2	6-1/4	9	39-7/8	53-3/8	*56-15/16	30-3/8	19-3/4	6-15/16	6-1/2
4	6	15	5E 5F	797	1060	1292	24	15-1/4	2-3/8	10-1/2	8-3/16	10-1/4	39-1/2	57-3/8	*60-15/16	34-3/8	24-1/16	9-7/8	8

651A — DIMENSIONS — BASE

MOTOR FRAMES	BASE	HA	HB	HD	HG	HL	BASE WT. LBS.
56-215T	7	20-1/2	36-1/2	9-1/4	3	10-5/16	92
254T	8	20-1/2	42-1/2	9-1/4	3	10-5/16	106
56-215T	7	20-1/2	36-1/2	9-1/4	3	12-3/16	92
254T	8	20-1/2	42-1/2	9-1/4	3	12-3/16	106
56-215T	7	20-1/2	36-1/2	9-1/4	3	12-3/16	92
254T	8	20-1/2	42-1/2	9-1/4	3	12-3/16	106
56-215T	7	20-1/2	36-1/2	9-1/4	3	11-7/16	92
254T	8	20-1/2	42-1/2	9-1/4	3	11-7/16	106
182T-213T	9	20-1/2	48-1/2	14	3	-2-15/16	121
215T-286T	10	20-1/2	56-1/2	14	3	-2-15/16	140
182T-215T	9	20-1/2	48-1/2	16-1/2	3	- 5/8	121
254T-286T	10	20-1/2	56-1/2	16-1/2	3	- 5/8	140
213T-256T	13	26-3/4	64-1/2	17-1/2	4	- 5/8	256
284TS-326T	14	26-3/4	72-1/2	17-1/2	4	- 5/8	287
213T-365T	14	26-3/4	72-1/2	19-1/4	4	-1-9/16	287
404TS-444T	18	29-1/8	82-1/2	19-1/4	4	-1-9/16	491



MODEL 653A
WITH OPTIONAL BRONZE
IMPELLER ILLUSTRATED

1 LIFTING EYE tap in shaft end simplifies disassembly.
2 EXTERNAL SHAFT ADJUSTMENT provides for renewing impeller clearance and maintaining pump efficiency.
3 DOUBLE ROW THRUST BEARINGS are added protection for high loads. Average bearing life is 10 years.
4 WATER SLINGER, and grease seals protect both bearings from moisture.
5 LEAKAGE ACCUMULATOR GLAND option to siphon off packing leakage.
6 STUFFING BOXES are machined for mechanical seals or packing. Either may be used without modification.
7 GASKETS protect shaft from pumped liquid corrosion and contamination.
8 IMPELLER VANES brought well into the inlet eye to pick up liquid early and to minimize clogging.
9 GREASE LUBRICATION purges old grease from both bearings.
10 RUGGED SHAFT with taper for easy impeller removal and minimum deflection.
11 HARDENED STAINLESS STEEL SLEEVE on packed pumps is securely key locked to the shaft.
12 .002 MAXIMUM SHAFT DEFLECTION at stuffing box face extends packing and mechanical seal life.
13 BACK PULLOUT DESIGN for pump maintenance, does not disturb suction or discharge piping.
14 SNAP RING groove is provided for a snap ring to aid in sleeve removal during preventative maintenance period.
15 STEEL IMPELLER KEY, capscrew and washer secures impeller to shaft.
16 NEMA STANDARD "HP" mounting face and shaft extension motors.
17 LARGE ACCESS OPENINGS provide adequate visibility and working room.
18 OVAL CLEANOUTS are large, HAND SIZE and located to provide visibility and accessibility to the impeller blades and the casing cutwater.
19 DISCHARGE flanges can be located in 45° increments for 8 different positions. (suction in 90° -vert. pumps)
20 STANDARD GAUGE TAPS are conveniently located at both the discharge and suction flange openings.
21 STANDARD DRAIN TAPS are located conveniently in the adapter bracket, suction elbow, and casing.

ENGINEERING SPECIFICATIONS

STUFFING BOX, SHAFT AND BEARING DIMENSIONS * Indicates Back to Back Bearings Qty. 2

AREA	DESCRIPTION		POWER SERIES 3C	4C	5E/5F
STUFFING BOX	Stuffing Box Bore Diameter	PACKING	3-9/32	3-9/32	4-25/32
	Stuffing Box Depth		2-3/4	2-3/4	3-1/2
	Outside Dia., Sleeve for Packing		2-1/2	2-1/2	3-3/4
	Total Number of Packing Rings With Lantern Ring		5	5	5
	No. of Rings in Front of Lantern Ring		2	2	2
	Packing Size		3/8	3/8	1/2
	Width of Lantern Ring		5/8	5/8	3/4
	Distance From Box to Nearest Obstruction		2-15/16	2-15/16	2-3/4
	Dia. of Mech. Seal (Bore)	M. SEAL	3-9/32	3-9/32	4-25/32
	Length of Mechanical Seal		3-1/4	3-1/4	4-7/16
	Outside Dia., Sleeve for Mechanical Seal		2-1/4	2-1/4	3-5/8

AREA	DESCRIPTION	POWER SERIES 3C	4C	5E/5F
SHAFT	Dia. at Impeller (Average of Taper)	1-7/16	1-7/16	2-1/4
	Diameter at Shaft Sleeve	1-7/8	1-7/8	3-1/4
	Diameter Between Bearings (Max. Shaft Dia.)	2-3/8	3-5/16	4-1/8
	Diameter at Coupling End	1-1/4	1-1/4	2-3/8
	Max. Deflection at Stuffing Box Face	.002"	.002"	.002"
BEARINGS	Bearing No. (Inboard Radial)	6310	6311	6317 (5E) 21317 (5F)
	Bearing No. (Outboard Thrust)	3310	3309	7315*
	Bearing Centers	7-9/32	7-3/4	12-11/16
	Minimum Life of Bearing Under Worst Conditions of Load	2 Years	2 Years	2 Years

LIMITATIONS (Maximum)

Hydrostatic test pressure	150 PSI
Case working pressure	125 PSI
Suction pressure	125 PSI
Temperature-Packing	250°F
Temperature-Mech. Seal	225°F
Operating speed	1775 RPM

DESCRIPTION	FITTED	MATERIAL OF CONSTRUCTION
Impeller	Iron	Cast Iron ASTM A48
Gland	Iron	Cast Iron ASTM A48
Packing	Iron	Graphite/Teflon Lubricated Acrylic Yarn
Insert	Iron	Cast Iron ASTM A48
Lant. Ring	Iron	Teflon
	Stainless	Stainless Steel AISI 316
Sleeve (Pack)	Iron	Hard. Stn. Steel AISI 440C
Sleeve (Seal	Iron	Bronze ASTM 862
Sleeve (Seal)	Stainless	Stainless Steel AISI 316
Impeller Screw	Iron	Steel SAE Grade 5
Shaft	Iron	Steel SAE 1045
Frame	Iron	Cast Iron ASTM A48
Casing	Iron	Cast Iron ASTM A48
Cover	Iron	Cast Iron ASTM A48
Supports	Iron	Steel

Furnish and install as shown on the plans, Aurora Model . . . . (Horizontal-651A) (Vertical-653A Flexible Coupled) (Vertical-652A Open Shaft) (Vertical-654A-Close Coupled) type Non-Clog Centrifugal pump. The pump shall be capable of delivering a capacity of . . . . GPM when operating against a total dynamic head of . . . . feet. The pump shall also deliver a maximum of . . . . GPM when operating against a head of . . . . feet. The minimum shut-off head acceptable will be . . . . feet.

The pump shall operate at a maximum speed of . . . . RPM. A unit operating at a lesser rotative speed will be considered, but in no event will a pump operating at more than the maximum speed specified be acceptable.

The pump casing shall be of the tangential design and will be constructed of cast iron and shall be of sufficient thickness to withstand stresses and strains at full operating pressures. Casings shall be subject to a hydrostatic pressure test of 125 lbs. A handhole is to be provided in the 3" and 4" casings for clean out purposes. The casing design shall allow front or rear impeller pullout.

The bearing housing is to be of cast iron and shall be furnished with a set of regreaseable bearings for both radial and thrust loads. A double row thrust bearing is to be provided to ensure maximum bearing life under extreme thrust loads. The bearings shall have an average life of 100,000 hours and shall be mounted in a machined, moisture and dust proof housing. The housing is to have a register fit and then bolted to the pump casing to insure permanent alignment.

An extra deep (split) packing box simplifying packing replacement and shaft sleeve inspection is to be provided and must be so arranged with a lantern ring for either grease lubrication or tapped connections for water sealing from an outside source. A 3/8" drain opening must be provided to facilitate removal of lubricating liquid.

The impeller to be of cast iron and shall be capable of passing a maximum sphere size of . . . . inches. The impeller shall be dynamically balanced before assembly into the pump and shall be securely fastened to the shaft by means of a steel key and impeller locknut. Axial adjustment of the impeller is to be external and a minimum clearance of . . . . thousands should be maintained between the impeller and suction wearplate. The pump shaft shall be constructed of high grade carbon steel having a tapered impeller extension and accurately machined. The minimum diameter acceptable between bearings will be 2-3/8 inches. The pump shaft shall be protected from wear by a corrosion and wear resisting hardened stainless steel shaft sleeve having a 450 minimum Brinell hardness. An "O" ring type gasket must be provided between the impeller hub and the shaft sleeve to prevent pumped liquid from corroding the shaft.

MODEL 651A HORIZONTAL

The pump and motor shall be mounted on a common (steel) (steel drip rim) base. Alignment shall be checked in accordance with the Standards of the Hydraulic Institute after installation and there shall be no strain transmitted to the pumps.

MODEL 652A VERTICAL OPEN SHAFT, 653A VERTICAL FLEXIBLE COUPLED AND 654A CLOSE COUPLED VERTICAL PUMPS

The pump shall be supported by a fab. steel pedestal base. The pedestal shall have openings large enough to permit access to the suction line. An optional handhole of not less than 3" in diameter must be provided in the suction elbow on 3" and 4" pumps. The pedestal must be of sufficient height so that the suction elbow will not touch the floor or foundation upon which it stands.

Vertical flexible coupled pumps shall be furnished with a fab. steel motor bracket which is to be bolted to a separate pump adapter. The motor bracket must be machined with a register fit to insure proper alignment of motor shaft and pump shaft. 654A is coupled directly to the motor shaft extension.

Vertical open shaft pumps are to be driven through flexible shafting with . . . . dia. tubing, and intermediate bearings. Shafting must be of sufficient size to transmit required horsepower and must be provided with a slip spline which will permit removal of the pump rotating assembly without removing any section of intermediate shafting, bearings, suction or discharge piping (. . . . sections required).

The Engineering Specification has been condensed from a very comprehensive specification. Additional information is available from any Aurora Pump Sales Office. Aurora Pump reserves the right to make revisions to its products and their specifications, and to this bulletin and related information without notice.

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WWEMA

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