

STEAM TURBINE DATA SHEET

90759T

149-M-44

BY BCS

REVIEWED

VTV

APPROVED

BCS

DATE 11-12-74

SHT. 1 OF 3

CLIENT CELANESE CHEM CO
 DESTINATION RISHP
 UNIT METHANOL
 ITEM PI-1220 NO. REQ'D. 1 JOB NO. ER 0995
 DRIVEN EQUIPMENT BOOSTER COMPRESSOR

1 MANUFACTURER TURBODYNE
 2 TYPE & SIZE TYPE 5 MULTI STAGE
 3 SERIAL NO. _____
 4 QUOTE NO. 20-216-74 DATE 7-5-74
 5 PURCHASE ORDER NO. 50022 DATE _____
 6 _____
 7 _____

OPERATING CONDITIONS

ITEM-COND:	RATED	MAX	Normal
HORSEPOWER:	3300	3000	2587
SPEED (rpm):	9670	9670	9386
INITIAL PRESS (psig)	600	600	600
INITIAL TEMP (Ftt):	750	750	750
EXH PRESS (psig/in Hg. abs):	40	40	40
EXH TEMP (Ftt):	SAT	SAT	SAT
* HAND VALVES OPEN:			
WATER RATE:	*	*	16.2
MAX. CASING PRESSURE (psig)		650 PSIG	
MAX. ALLOW. PRESS. EXH. END (psig)		75 PSIG	
INDOOR _____ OUTDOOR <input checked="" type="checkbox"/> ROOF: <input checked="" type="checkbox"/> No			
WINTERIZATION: <input checked="" type="checkbox"/> No			
DUTY: cont. <input checked="" type="checkbox"/> intermit _____ stand by _____ hrs/yr <u>8760</u>			
STEAM COST: \$/M# _____ PAYOUT PERIOD (yrs) _____			

CONSTRUCTION FEATURES (cont.)

8 COUPLING: make BENDIX type Model 67500/12" space
 9 Mount Coupling Half: _____ Yes - No
 10 Lubrication: NONE Mounting: NEMA TAPER
 11 Furnished by: COMPRESSOR DOUBLE KEY
 12 INSULATION: No type INSUL LUBS - YES
 13 JACKET: No type _____
 14 GEAR UNIT: required. NO type _____
 15 _____
 16 _____

TURBINE SPECIFICATIONS

17 NO. OF STAGES *
 18 ROTOR TYPE: solid YES built up _____
 19 SPEED (rpm): max. allow 10150 1st crit * trip 11165
 20 NO. AUTO VALVES: _____ TYPE LIFT: cam _____ bar _____
 21 BEARINGS: radial type & size TILT-PAD
 22 THRUST: type & size TILT-PAD (Kingsbury)
 23 PACKING TYPE: end glands LABYRINTH
 24 Interstage Diaphragms LABYRINTH
 25 MATERIALS: *
 26 Steam Inlet Parts CARBON STEEL
 27 Casing C. STEEL Shaft FORGED - INTCRAC
 28 Nozzles S.S. Nozzle Rings S.S.
 29 Wheels SOLID FORGED blading S.S.
 30 Shrouds S.S. Gov. Trim Valve S.S.
 31 Labyrinths S.S.
 32 Shaft Material Under Packing _____
 33 Applied By: spraying _____ plating _____
 34 NET WEIGHT: _____ SHIPPING WEIGHT: _____
 35 ROTOR WEIGHT: _____
 36 WEIGHT HEAVIEST PIECE FOR MAINT: _____

CONSTRUCTION FEATURES

TYPE: vert _____ horiz. NO. STAGES: single _____ mult
 ROTATION (from gov end): cw _____ ccw
 GOVERNOR: mech. _____ hydr _____ oil relay NEMA class D
 CONTROL: WOODWARD PG-PL

GOVERNOR VALVE TYPE: single mult _____
 AIR HEAD FOR INSTRUMENT CONTROL YES JACK SCREW _____
 Range 25 % below 10,000 rpm
 Max. rpm @ 10,000 @ 15 psig - Min rpm @ 7500 @ 3 psig

* HAND SPEED CHANGER: range 10,000 max rpm 7500 min rpm _____
 TRIP-THROTTLE VALVE: separate _____ COMBINED _____
 Remote trip YES Actuation DE-ENERGIZE
 Other trip LOCAL Actuation MANUAL
 Other trip EMERGENCY Actuation METH-GOV

SOLE PLATE BASE PLATE _____ FURNISHED BY TURBODYNE
 Turbine Turbine & Gear _____ Driven Eqpt. _____

STEAM INLET: rating 600 facing RF orient RIGHT
 EXHAUST: rating 150 facing RF orient UP

- * DRAINS: no. _____ type & size _____
- * VENTS: no. _____ type & size _____
- * WATER CONN: no. _____ type & size _____
- * LUBE OIL INLET: no. _____ type & size _____
- * LUBE OIL OUTLET: no. _____ type & size _____
- * SEAL STEAM CONN: no. _____ type & size _____
- * GLAND DRAIN CONN: no. _____ type & size _____
- * INSTRUMENT CONN: no. _____ type & size _____
- * OTHER CONN: service _____ type & size _____

GEAR SPECIFICATIONS

MANUFACTURER _____ DESIGNATION _____
 BUILT IN _____ SEPARATE _____
 NO. OF REDUCTIONS _____ RATIO _____
 CL. to CL. OF SHAFTS _____ FACE WIDTH _____
 TYPE OF BEARINGS _____ TYPE LUBR _____
 AGMA GEAR: service factor _____ type _____
 ROTATION L.S. (from gov end): cw _____ ccw _____
 SPEED OF L.S. (rpm): _____
 LUBRICATION: _____
 NET WEIGHT: _____ SHIPPING WEIGHT: _____
 WEIGHT HEAVIEST PIECE FOR MAINT: _____
 MATERIALS: _____
 51 Case _____ Shaft _____
 52 Case _____ Pinion _____
 53 Brgs _____

* VENUE TO SPECIFY

CHKD. DATE 12-12-74 5-12
 VINE
 DATE 12-12-74 5-12



90759T

PT-1220

GEAR SPECIFICATIONS (cont.)

COUPLING: ~~no~~ Yes - No
 Mount Coupling Flange: Yes - No
 Lubrication: Mounting
 Furnished by: TURBODYNE TO FURNISH LUBE OIL SUPPLY AND RETURN MANIFOLD TO COUPLING AREA LUBE OIL SYSTEM
 TYPE: BY OTHERS
 PRESS (psig): driver _____ gear _____ control _____
 System Design: _____ R.V. Set _____
 SCHEMATIC DIAGRAM: _____
 GPM: turb _____ gear _____ control oil _____
 Driven Equipment _____
 MAIN PUMP: make _____ type _____
 Casing Mat'l. _____ Flanges _____
 Speed _____ gpm _____
 Driver _____ hp _____
 Coupling _____
 Location _____ Control _____
 AUX. PUMP: make _____ type _____
 Casing Mat'l. _____ Flanges _____
 Speed _____ gpm _____
 Driver _____ hp _____
 Coupling _____
 Location _____ Control _____
 COOLER: no _____ make _____ location _____
 Duty _____ Surface _____ Water (gpm) _____
 Shell: o.d. _____ thickness _____ des. press. _____
 Tubes: o.d. _____ length _____ b/wg _____ no. _____
 Material: shell _____ channel _____ tubes _____
 Switch Valve: make _____ mat'l. _____
 FILTERS: no _____ make _____ type _____
 Casing Mat'l. _____ Flanges _____
 Design Press _____ Δ P _____ Micron _____
 Switch Valve: make _____ mat'l. _____
 RESERVIOR: location _____ size _____
 Retention _____ Material _____
 Flanges _____ Interior Coating _____
 Heating Coil _____
 Insulation Supports _____
 NET WEIGHT _____ SHIPPING WEIGHT _____

1 INSTRUMENTATION
 2 CONTROL PANEL. ~~Yes~~ No furnished by _____
 3 INSTRUMENTS MAKE SIZE LOCATION
 4 STEAM INLET PG VALVE & PLUG ONLY YES
 5 STEAM CHEST PG " " " YES
 6 1st STAGE STEAM PG " " " YES
 7 EXHAUST STEAM PG " " " YES
 8 L.O. PRESS at PUMP
 9 L.O. PRESS at BRGS VALVE & PLUG ONLY YES
 10 GLAND SEAL " " " YES
 11 BRG. TEMP. Δ ASHCROFT 5" EA. BRG DR
 12 L.O. to COOLER
 13 L.O. from COOLER
 14 C.W. to OIL COOLER
 15 C.W. from OIL COOLER
 16 G.G. L.O. RESER.
 17 FLOW INDICATOR * * EA. RES. DR
 18 LOW L.O. PRESS. ALARM DDALSNR-DPDT YES
 19 AUX. L.O. PUMP RUN ALARM (X-Proof)
 20 THROTTLE VA. TRIP ALARM
 21 TACHOMETER: vibrating reed N/D electrical YES-AIR PA.
 22 SPEED TRANSMITTER: Yes No type PICKUP ONLY
 23
 24 READOUT BY
 25 TURBINES: API 612 ELEC: class I group D div 2
 26 PIPING: ANSI VESSELS: EXCHANGERS: Δ
 27 GEAR: B31.3
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ALLOWABLE PIPING FORCES & MOMENTS

	INLET FLANGE		EXHAUST FLANGE	
	Force lb.	Moment ft.-lb.	Force lb.	Moment ft. lb.
PARALLEL TO SHAFT				
VERTICAL				
HORIZ. 90° TO SHAFT				

UTILITIES

37 STEAM AUX: inlet _____ psig Ftt EXH _____ psig/in Hg abs
 38 ELECTRICAL POWER: 460 v 3 ph 60 cy
 39 CONTROL: 120 v 1 ph 60 cy
 40 COOLING WATER: temp 90 F-Press 50 psig
 41 INSTRUMENT AIR (psig): 90 SERVICE AIR (psig): 90

INSPECTION & TESTS

Item	Required		Witnessed	
	Yes	No	Yes	No
Shop Inspection	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Mechanical Run	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Performance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bearings (Post Run)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Auxiliary Equipment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
With Gear	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hydrostatic	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

EXCEPTIONS TO SPECIFICATIONS
 44 ① ②
 45
 46 ② ③
 47
 48 ③ TURBODYNE TO FURNISH CARROLL
 49 GOODMAN (SODERBERG) DIAGRAMS FOR
 50 LAST TWO STAGES
 51 ④ FIVE BENTLY NEVADA PROBE (2) RADIAL
 52 EACH PAK (1) THRUST
 53 ⑤ LOW OIL PRESS TRIP & SOLENOID
 54 TRIP FURNISHED 120 VOLT 60 CYCLE
 55 ⑥ TURBODYNE TO COMPLY WITH SPEC
 S-50.03-03 REV. 2
 ⑦ GUARANTEED WATER DATE

REV NO. _____
 BY _____
 CHK'D _____
 DATE _____
 APPROV'D _____
 ORIGINAL _____

NO. 340DR-20 DIETZGEN GRAPH PAPER
 20 X 20 PER INCH
 EUGENE DIETZGEN CO.
 MADE IN U. S. A.

BOOSTER COMPRESSOR Turbine Drives
PT-1220

600^{#G} - 750^{#F} - 55^{#G}
 3300 H.P. @ 9670 R.P.M.
 9010 R.P.M.

3000 H.P. @ 9670 R.P.M.

5100
 3000 = 17[#] HP/HR

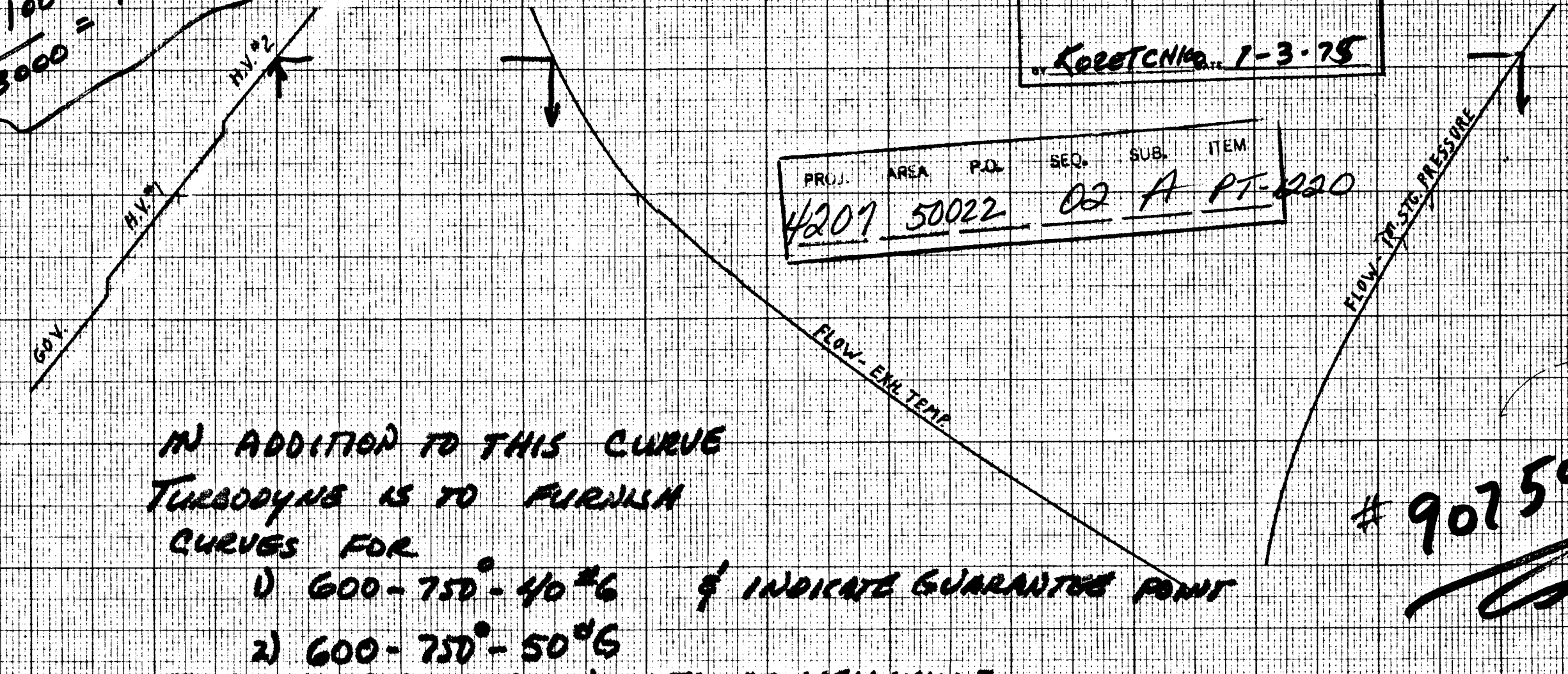
<input checked="" type="checkbox"/>	(1) APPROVED - MFG. MAY PROCEED.
<input type="checkbox"/>	(2) APPROVED - SUBMIT FINAL DWG. - MFG. MAY PROCEED.
<input type="checkbox"/>	(3) APPROVED EXCEPT AS NOTED - MAKE CHANGES AND SUBMIT FINAL DWG. - MFG. MAY PROCEED AS APPROVED.
<input type="checkbox"/>	(4) NOT APPROVED - CORRECT AND RESUBMIT.
<input type="checkbox"/>	(5) REVIEW NOT REQUIRED - MFG. MAY PROCEED.

APPROVAL OF THIS DRAWING DOES NOT RELIEVE THE SUPPLIER OF RESPONSIBILITY FOR ACCURACY OF DIMENSIONS, PERFORMANCE, DESIGN, DESIGN DETAILS OR CONFORMANCE TO SPECIFICATION AND PURCHASE ORDER REQUIREMENTS.

DAVY POWERGAS INC.
 KOLETCHIK 1-3-75

PROJ.	AREA	P.O.	SEQ.	SUB.	ITEM
4207	50022		02	A	PT-1220

FLOW - #/HR
 60000
 50000
 40000
 30000
 20000
 10000
 0



TURB. NO. 32595
 S.O. NO. U-19181

TURBODYNE CORPORATION — Steam Turbine Division
 WELLSVILLE, NEW YORK 14895 U. S. A.

DATE 12-9-74
 EM-18026

- 28- THIS LINE
- 29- SEE ELECTRICAL DRAWING FOR PROBES
- 30-
- 31-
- 32- CUSTOMER TO PROVIDE ADEQUATE SUPPORT UNDER T & T VALVE SUPPORT FLANGE AT INSTALLATION FOR ESTIMATED LOAD OF 300 LBS.
- 33-
- 34- KEY FURNISHED BY TURBODYNE
- 35- BOLT HOLES IN FLANGES TO STRADDLE HORIZONTAL AND VERTICAL CENTERLINES

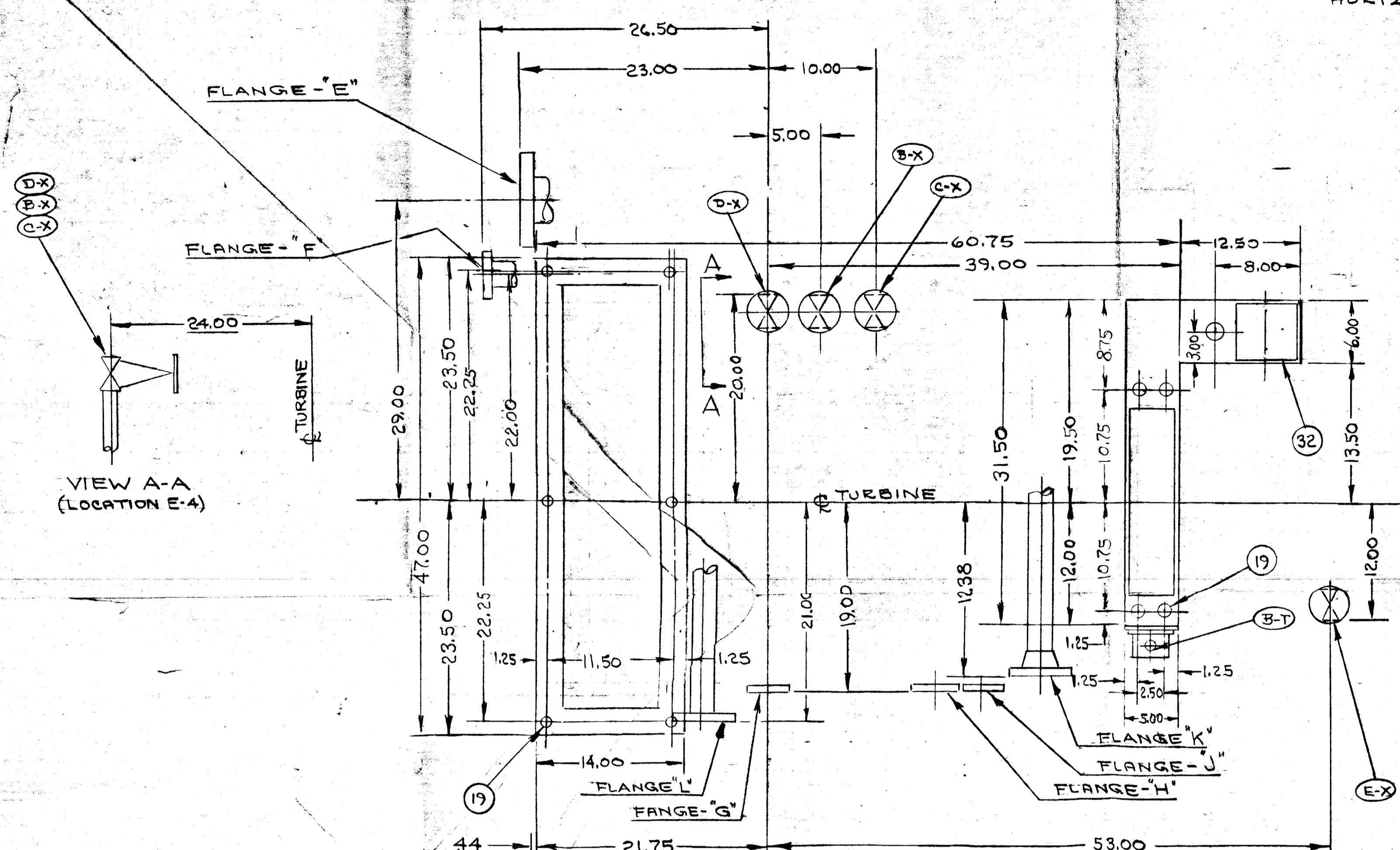
- 1- STEAM INLET & EXHAUST PIPING MUST BE PROPERLY SUPPORTED SO AS NOT TO EXCEED ALLOWABLE FORCES AND MOMENTS GIVEN.
- 2- HOLD DOWN BOLTS SHOULD NOT BE RIGIDLY LOCATED UNTIL UNIT IS IN PLACE ON FOUNDATION AS BOLT HOLES MAY VARY .25 DUE TO VARIATION IN CASTING.
- 3- AN ATMOSPHERIC RELIEF VALVE OF SUFFICIENT SIZE TO PASS 57,745 LBS PER HOUR WITH A MAXIMUM PRESSURE OF 70 PSI, G AND SET TO OPEN AT 40 PSI, G SHOULD BE PLACED IN THIS LINE- NO SHUT-OFF VALVE SHOULD BE PLACED BETWEEN RELIEF VALVE AND TURBINE.
- 4- VENT SCREW- LOOSEN TO ALLOW AIR TO BLEED FROM GOVERNOR HYDRAULIC SYSTEM WHEN FIRST PUT INTO SERVICE OR IF TAKEN DOWN, DRAINED AND REFILLED.
- 5- HAND SPEED ADJUSTMENT KNOB MUST BE BACKED OUT AND LOCKED DURING AUTOMATIC SPEED CONTROL
- 6- HOLD DOWN BOLTS FURNISHED BY OTHERS
- 7- SHIMS FURNISHED BY OTHERS
- 8- THIS DIMENSION INCREASES TO 69.00 WHEN REMOVING UPPER HALF OF TURBINE
- 9- SENTINEL VALVE
- 10 HAND VALVES 2 REQUIRED
- 11- AIRPAX MODEL 1-0005 PICKUP WITH 72 TOOTH GEAR IN WOODWARD GOVERNOR WITH 18.00" OF CABLE
- 12-
- 13- COMPRESSED LENGTH OF SPRING= 4.75
- 14- ALLOW FOR GROUTING
- 15- LAGGING LUGS TO BE FURNISHED BY TURBODYNE
- 16- KEYWAY- SEE DETAIL
- 17- HIGH SPEED STOP OVERRIDE DEVICE
- 18- PNEUMATIC GOVERNOR SPEED CONTROL AIR SETTINGS:
 15" AIR= 10000 R.P.M. TURBINE SPEED- MAX.
 3" AIR= 7500 R.P.M. TURBINE SPEED- MIN.
- 19- 11 HOLES - 1/2" DIA. FOR 1/2" DIA. BOLTS 5" IN STEAM END SOLE PLATE & IN EXHAUST END SOLE PLATE (SEE NOTE #2)
- 20- SOLENOID DUMP VALVE TO TRIP WHEN DE-ENERGIZED - 115 VOLTS A.C.
- 21- LOW OIL PRESSURE ALARM SWITCH
- 22- SHAFT NUT FURNISHED BY TURBODYNE
- 23- 8 HOLES - 1/2" DIA. - 50 DEEP- EQUALLY SPACED AS SHOWN IN VIEW 'X'
- 24- LOW OIL PRESSURE TRIP CYLINDER
- 25- USE DRY AIR OR INERT GASES FOR PURGING GOVERNOR PURGING PRESSURE SHOULD BE SLIGHTLY OVER ATMOSPHERIC PRESSURE.
- 26

CUSTOMER'S FLANGED CONNECTIONS

FLANGE	ANSI SIZE	OD	B.C.	NO HOLES	DIA HOLES	MINI FLANGE THICKNESS	RAISED FACE	REMARKS
A TURBINE INLET	600	6	14.00	11.50	12	1.18	25x 0.50 DIA.	NOTE #1
B TURBINE EXHAUST	150	12	19.00	17.00	12	1.31	.06x 1/8 DIA.	NOTE #1 & 3
C TEST VALVE ABOVE STEAM INLET	600	3/4	4.62	3.25	4		.62	25x 1/4 DIA
D TEST VALVE BELOW STEAM INLET	600	3/4	4.62	3.25	4		.62	25x 1/4 DIA
E MAIN OIL DRAIN	150	4	9.00	7.50	8		.94	.06x 1/8 DIA
F MAIN OIL SUPPLY	150	1/2	5.00	3.88	4		.62	.06x 1/8 DIA
G EXHAUST DRAIN	150	3/4	3.88	2.75	4		.50	.06x 1/8 DIA
H FIRST STAGE DRAIN	300	3/4	4.62	3.25	4		.62	.06x 1/8 DIA
J NOZZLE BOWL DRAIN	600	3/4	4.62	3.25	4		.62	25x 1/4 DIA
A-V								
B-V								
L EXH. END BACKING OIL LEAK OFF	300	2	4.50	5.00	8	3/4	.67	.06x 3/16 DIA
K STEAM END PACKING OIL LEAK OFF	150	2	6.00	4.75	4	3/4	.75	.06x 3/16 DIA

CUSTOMER'S SCREWED CONNECTIONS

CONNECTION	NO	SIZE	VALVE REQUIRED	VALVE SUPPLIED BY	PIPE TO	REMARKS
A-J TEST VALVE STEM LEAK OFF	1	2 PIPE	NO		OPEN DRAIN	
B-J GOV. VALVE STEM LEAK OFF	1	2 PIPE	NO		OPEN DRAIN	
A-S PNEUMATIC SPEED CONTROL	1	2 PIPE	NO		CUSTOMER'S AIR SUPPLY	NOTE # 18
B-S GOVERNOR PURGE AIR CONNECTION	1	1 PIPE	NO		CUSTOMER'S AIR SUPPLY	NOTE # 25
A-T TACHOMETER MAGNETIC PICKUP	1					NOTE # 11
B-T LOW OIL PRESSURE ALARM SWITCH	1	2 PIPE	NO			NOTE # 21
OT SOLENOID DUMP VALVE CONDUIT CONN.	1	3 PIPE	NO			NOTE # 20
A-X INITIAL PRESS GAUGE CONN. (IN VALVE)	1	2 PIPE	YES	TURBODYNE	GAUGE	PLUGGED
B-X FIRST STAGE PRESS GAUGE CONN.	1	2 PIPE	YES	TURBODYNE	GAUGE	PLUGGED
C-X NOZZLE BOWL PRESS GAUGE CONN.	1	2 PIPE	YES	TURBODYNE	GAUGE	PLUGGED
D-X EXHAUST PRESS GAUGE CONN.	1	2 PIPE	YES	TURBODYNE	GAUGE	PLUGGED
E-X BEARING OIL PRESS GAUGE CONN.	1	2 PIPE	YES	TURBODYNE	GAUGE	PLUGGED



VIEW ARROW X
 SCALE: 3.00=12.00

