NSV

RILEY

1.0 PREDICTED PERFORMANCE DATA

Predicted Performance Data – One(1) steam generating unit, 170,000 pounds of steam per hour maximum continuous capacity; 1280 psig operating pressure; 955°F steam temperature; 402°F feedwater.

Guarantee Fuel:

Wood (% by wt): Moisture: 30.0; C: 35.69; O2: 28.83; N2: 0.13; S: 0.06; H2: 3.67; Ash 1.55; Cl: 0.07; 5814 Btu per pound as fired

Alternate Fuels:

Wood (% by wt): Moisture: 20.0; C: 40.71; O2: 32.91; N2: 0.18; S: 0.08; H2: 4.01; Ash 2.0; Cl: 0.11; 6558 Btu per pound as fired

Wood (% by wt): Moisture: 50.0; C: 25.66; O2: 20.67; N2: 0.02; S: 0.03; H2: 2.98; Ash 0.64; 4326 Btu per pound as fired

Boiler Load: / Fuel – % Moisture:	85% / 30%	MCR / 20%	MCR / 50%	MCR / 30%
1. Lbs of steam per hr actual evap.	145,000	170,000	170,000	170,000
2. Total K Btu output per hour	161,058	185,911	185,911	185,911
3. Excess air in AH exit gases, %	35	30	35	30
4. Temp. of AH exit gases, °F	300	300	335	310
5. Temp. of water ent. econ., °F	386	402	402	402
6. Water press. drop thru econ., (exclusive of static head), psi	25	35	35	35
7. Temp. of air ent. FD fan, °F	80	80	80	80
8. Steam temp. lvg. SH, °F	955	955	955	955
9. Steam press. at SH outlet, psig	1280	1280	1280	1280
10. Steam press. drop thru SH, psi	80	110	110	110
11. Boiler drum press., psig	1360	1390	1390	1390
12. Air side pressure drops, iwc				
a. Loss thru inlet duct & venturi	2.0	2.3	3.5	2.5
b. Loss thru air heater	3.8	4.4	6.5	4.7
c. Loss thru ducts & dampers	2.3	2.7	4.0	2.9
d. Loss thru firing equipment	2.3	2.7	4.0	2.9
13. FD Fan total static pressure	10.5	12.1	18.0	13.0
14. Gas side draft losses, iwc				
a. Furnace draft	0.5	0.5	0.5	0.5
b. Loss thru SH & boiler bank	0.6	0.7	1.2	0.7
c. Loss thru econ & AH	1.1	1.2	2.1	1.4
d. Loss thru ducts & dampers	0.5	0.6	1.0	0.7

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Boiler Load: / Fuel – % Moisture:	85% 30%	MCR 20%	MCR 50%	MCR 30%
15. Lbs of fuel per hour	34,205	33,840	59,902	39,539
16. Lbs of air per hour for combustion	191,100	205,000	250,300	212,720
17. Lbs of gas per hour lvg. economizer	224,800	238,200	309,900	251,660
18. Furnace volume heat release, Btu/cu ft/hr	13,990	15,620	18,230	16,180
19. Furnace area heat release, Btu/sq ft/hr	31,760	36,350	38,650	36,780
20. Grate heat release, Btu/sq ft/hr	613,790	684,950	799,810	709,510
21. Overall unit efficiency, %	79.19	82.05	70.18	79.14
HEAT LOSS EFFICIENCY, %				
22. Loss due to dry flue gas	5.33	5.16	6.16	5.38
23. Loss due to H2 & fuel moist.	12.40	9.76	20.61	12.45
24. Loss due to moisture in air	0.13	0.13	0.15	0.13
25. Loss due to radiation	0.45	0.40	0.40	0.40
26. Loss due to unburned combustibles	1.00	1.00	1.00	1.00
27. Manufacturer's margin	1.50	1.50	1.50	1.50
28. Total losses	20.81	17.95	29.82	20.86
29. Overall unit efficiency, %	79.19	82.05	70.18	79.14

RILEY

2.0 GENERAL BOILER DATA

Rated Steaming Capacity:	170,000 lbs/hour
Furnace Depth:	20'-8"
Furnace Width:	17'-0"
Furnace Volume:	17,136 ft^3
Grate Area:	368 sq. ft.

Heating Surfaces

Boiler Bank:	11,711 sq. ft.
Water Walls Comb.:	3,882 sq. ft.
Economizer:	6,939 sq. ft.
Tubular Air Heater:	31,955 sq. ft.
Superheater (radiant and primary)	10,201 sq. ft.

Maximum Allowable Working Pressure

Main Steam Drum:	1475 psi
Economizer:	1475 psi
Superheater:	1475 psi

Water Capacity

Normal Working Level:	11,729 gallons
Hydrostatic Test:	16,855 gallons

RILEY

3.0 FAN PREDICTED PERFORMANCE DATA

3.1 Forced Draft Fan

	Units	MCR	T.B.
Boiler Load	%MCR	100	Fan Design
Air Flow Ent. Each	#/hr.	248,530	
Air Flow Ent. Each	#/ACFM	58,450	67,300
Air/Gas Inlet Temp.	°F	80	125
Static Press. at Inlet	"W.G.	1.5	2.0
Static Press. at Outlet	"W.G.	16.5	21.8
Total Static Pressure	"W.G.	18.0	23.8
Rotor Speed	RPM	1172	1172
Tip Speed	FPM	20972	20972
BHP		235	288
Inlet Density	$\#Ft^3$	0.0710	0.0655
Inlet Velocity	FPM	5587	6433
Outlet Velocity	FPM	3258	3750
Fan Static Efficiency	%	68.4	84.9
Dampers % Open	%	47	90

3.2 Hot Overfire Air Booster Fan

	Units	MCR	T.B.
Boiler Load	%MCR	100	Fan Design
Air Flow Ent. Each	#/hr.	99,500	
Air Flow Ent. Each	#/ACFM	39,200	43,030
Air/Gas Inlet Temp.	°F	450	500
Total Static Pressure	"W.G.	20	24
Rotor Speed	RPM	1763	1763
Tip Speed	FPM	26208	26208
BHP		263	191
Inlet Density	$\#Ft^3$	0.0424	0.0402
Inlet Velocity	FPM	7245	7953
Outlet Velocity	FPM	7377	8097
Fan Static Efficiency	%	74.2	83.3
Dampers % Open	%	48	90

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3.3 Distributor Air/Cinder Return Fan

	Units	MCR	T.B.
Boiler Load	%MCR	100	Fan Design
Air Flow Ent. Each	#/hr.	23,800	
Air Flow Ent. Each	#/ACFM	5,555	6,110
Air/Gas Inlet Temp.	°F	80	110
Static Pressure At Outlet	"W.G.	31	37.2
Rotor Speed	RPM	3570	3570
Tip Speed	FPM	24400	24400
BHP		48.5	54.1
Inlet Density	$\#Ft^3$	0.0714	0.0676
Inlet Velocity	FPM	4310	4740
Outlet Velocity	FPM	4505	4955
Fan Static Efficiency	%	58.0	71.2
Dampers % Open	%	65	full

DESCRIPTION OF UNIT

1.0 GENERAL

Steam generating unit is a Riley type VR boiler for indoor service and balanced draft operation. The maximum continuous rating (MCR) is 170,000 lbs. of steam per hour at 1280 psig and 955°F, at the superheater outlet from feedwater at 402°F when firing wood chips.

The boiler is top supported by the structural steel framework from ground elevation 0'-0" to the top of the steel elevation 82'-0". The steam drum, with its horizontal centerline at elevation 71'-9", is supported near each end by large "U" shaped straps hung from the supporting steel framework. All headers and tubes are suspended by a system of hanger rods.

The furnace is reinforced at a number of levels by girdling with buckstays. An airtight setting is formed by the welded waterwall construction. Outside wall surfaces are covered by thermal insulation material and protected by ribbed embossed aluminum lagging.

Please refer to other sections of the manual for write-ups and bulletins by Riley Stoker Corporation and other subvendors.

2.0 WATER AND STEAM SYSTEM

The thermally induced circulation in the boiler is natural, caused by the difference in the density between water and a water/steam mixture. Refer to Figure 1.

Water replaces the steam generated in the boiler and delivered to the superheater outlet by first entering the upper steam drum at elevation 71'-9". On entering the steam drum, the incomming feedwater is distributed along the drum's length by the internal feed pipe into the water reservoir. Boiler water flows from the upper steam drum through the boiler bank tubes to the lower drum and from the lower drum through downcomers to the waterwall inlet headers.

A steam/water mixture is generated in the waterwalls by radiant heat transfer and in the first section of tubes in the boiler bank by convection heat transfer. The mixture from the side waterwalls enters the steam drum through releaser tubes. The front and rear waterwall tubes and boiler bank tubes connect directly to the upper steam drum. Inside the steam drum, the mixture passes through a series of mechanical separators designed to separate the water from the steam.

The dry steam now exits the upper drum through the feeder tubes to the primary superheater assemblies. The steam passes first through the 2-1/4" O.D. primary superheater assemblies and then through the 1-1/2" O.D. radiant superheater assemblies to the radiant superheater outlet header at elevation 74'-3" and the 10 3/4" superheater outlet pipe.

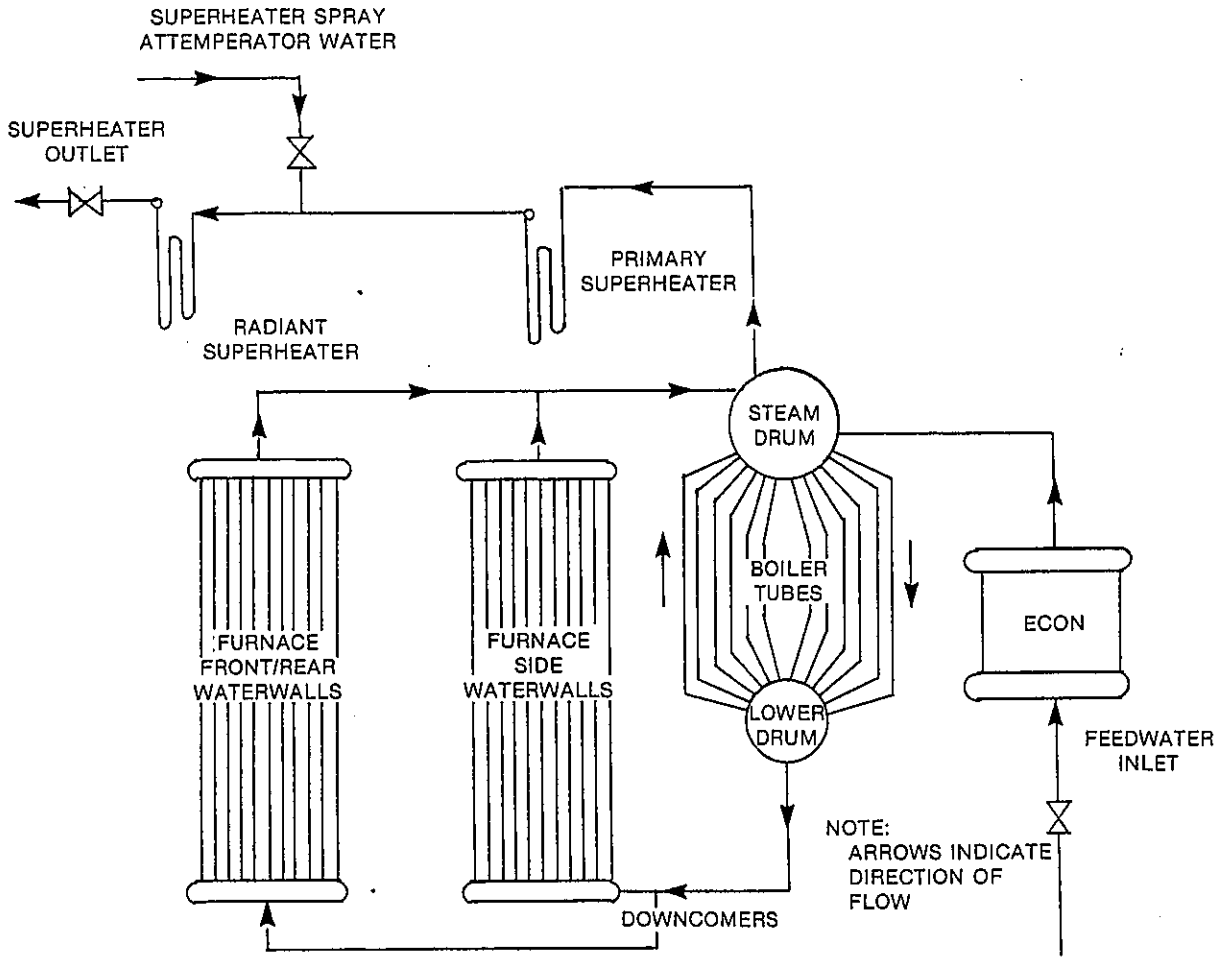


Figure 1. Water and Steam Flow

2.1 Economizer

A Riley continuous tube economizer is installed in the gas outlet ductwork between the economizer inlet header installed at elevation 51'-10", and the economizer outlet header at elevation 57'-2". Feedwater enters the inlet header and passes through the 2" O.D. economizer tubes, absorbing heat from the flue gases leaving the boiler. The heated water exits the economizer through the outlet header and flows to the upper steam drum.

2.2 Drums

2.2.1 Main Steam Drum

As shown in Figure 2, the steam drum has a 54" I. D. and is located near the top of the unit with its horizontal centerline at elevation 71'-9".

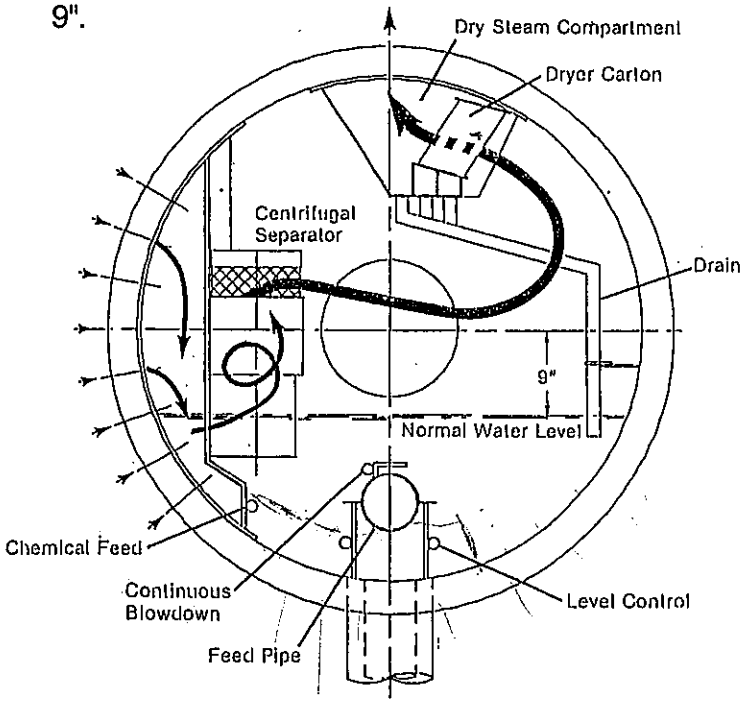


Figure 2. Main Steam Drum

The drum contains centrifugal separators, baffle plates and dryer cartons. These are used to assure the delivery of dry saturated steam from the drum. The drum is also equipped with a feed pipe, continuous blowdown pipe, chemical feed pipe and drum water level probes for the purposes of proper feedwater distribution, boiler water treatment, and drum level indication and control.

2.2.2 Lower Drum

The lower drum has a 42" I.D. and is located below the steam drum on the same vertical centerline, with its horizontal centerline at elevation 57'-3"".

Boiler water, from the lower drum, travels down two 12-3/4" O.D. main downcomers. At elevation 22'-11-3/8" the main downcomers split off into six 10-3/4" downcomer branch lines which supply the side/rear lower waterwall headers. The lower front waterwall header is fed directly from the two main downcomers.

2.3 Boiler Bank

There are twenty-four rows of 2-1/2" O.D. boiler bank tubes, swaged to 2" O.D. where they connect to the steam drum and the lower drum. These tubes absorb heat from the flue gas by convection. Subject to hotter gases, boiler water, in the front of the generating tubes, changes into a steam/water mixture and flows back into the steam drum. The cooler, rear tubes direct the boiler water from the steam drum into the lower drum.

2.4 Waterwalls

Complete fuel combustion takes place in the furnace, which consists of the front, rear, roof, and side waterwalls. In general the front, rear, and side waterwalls consist of 3" O.D. tubes arranged on 4" centers. All waterwalls are of welded wall construction.

2.4.1 Front Waterwall

The front waterwall tubes are supplied water from a 10-3/4" O.D. lower front waterwall header located at elevation 22'-11-3/8". The tubes which make up the front waterwall extend from the front waterwall header to elevation 26'-8". At this point the lower furnace arch is formed. The tubes then extend to elevation 67'-0", bend rearward forming the furnace roof and terminate in the steam drum.

2.4.2 Rear Waterwall

The rear Waterwall tubes are supplied water by a 10-3/4" lower rear waterwall header, that is fed by two 10-3/4" downcomer branches. The tubes which make up the rear waterwall extend from elevation 15'-6" to the lower furnace arch, then upward to elevation 43'-9" where the nose arch section is formed. The tubes then extend to elevation 772'-3" where they enter a separate chamber located inside the lower drum. This portion of the drum acts as a distribution header in the rear waterwall circuit. By preventing the warmer steam/water mixture in the waterwall from coming in contact with the cooler water in the lower drum, proper circulation is preserved. Exiting the lower drum the tubes extend to elevation 70'-0" and terminate in the steam drum.

2.4.3 Side Waterwalls

There are two side waterwalls. Each is supplied water from a 10-3/4" O.D. lower side waterwall header, each fed by two 10-3/4" downcomer branches.The tubes that make up each side waterwall extend from elevation 15'-7" and terminate into two 10-3/4" O.D. upper side waterwall headers at elevations 72'-7-1/2" and 73-7-1/2". These upper headers are connected to the steam drum by releaser tubes.

2.4.4 Furnace Wall Openings

Tube bends provide a means for access and observation doors, soot blowers, oil burners, overfire air, and instrument connections. These openings are made by bending the furnace waterwall tubes to allow the innner wall surfaces to remain smooth and unobstructed. The openings are sealed with refractory and boot-type casing.

2.5 Superheater

Superheater feeder tubes from the top of the main steam drum connect to the 33 primary superheater assemblies made from 2-1/4" O.D. tubes. These assemblies terminate into a 10-3/4" O.D. primary superheater outlet header at elevation 76'-4". The superheated steam then flows through a 8-5/8" cross-over pipe and spray type desuperheater into the 10-3/4" radiant superheater inlet header at elevation 74'-3". There are seven (7) radiant superheater assemblies across the width of the furnace, made from 1-1/2" O.D. tubes that terminate in the 12-3/4" radiant superheater outlet header. Superheated steam discharges from this header through the 10-3/4" O.D. superheater terminal pipe.

2.6 Steam Temperature Control

Superheater steam temperature is controlled to 955°F with a direct contact attemperator (desuperheater) located in the 8-5/8" crossover pipe between the primary and radiant superheaters. Here highly pure water is atomized by a spray nozzle and injected into the superheater steam line where the sprayed water vaporizes and mixes with the superheated steam reducing its temperature. The amount of water to the attemperator is controlled by a superheat spray control valve.

2.7 Miscellaneous

The boiler is provided with steam pressure gauges, water columns, remote drum level indicators, safety valves, vent and drain valves, nozzles, etc.

3.0 AIR AND GAS SYSTEM

As shown in Figure 3, a forced draft fan supplies combustion air which is first heated by a three pass tubular air heater. From the tubular air heater, the air is ducted to the overfire air fan inlet and to the undergrate air system for combustion and cooling. The overfire air fan delivers preheated air to overfire air nozzles. A distributor air/cinder return fan supplies transport air to the three pneumatic fuel distributors and the pneumatic flyash reinjection system. The flyash return system consists of air ducts, venturis, piping and nozzles which return flyash from the economizer hoppers and the dust collector hoppers to the furnace for recovery of unburned carbon. Ambient combustion air is supplied to the start-up burner via a forced draft fan which is supplied with the packaged auxiliary fuel burning system.

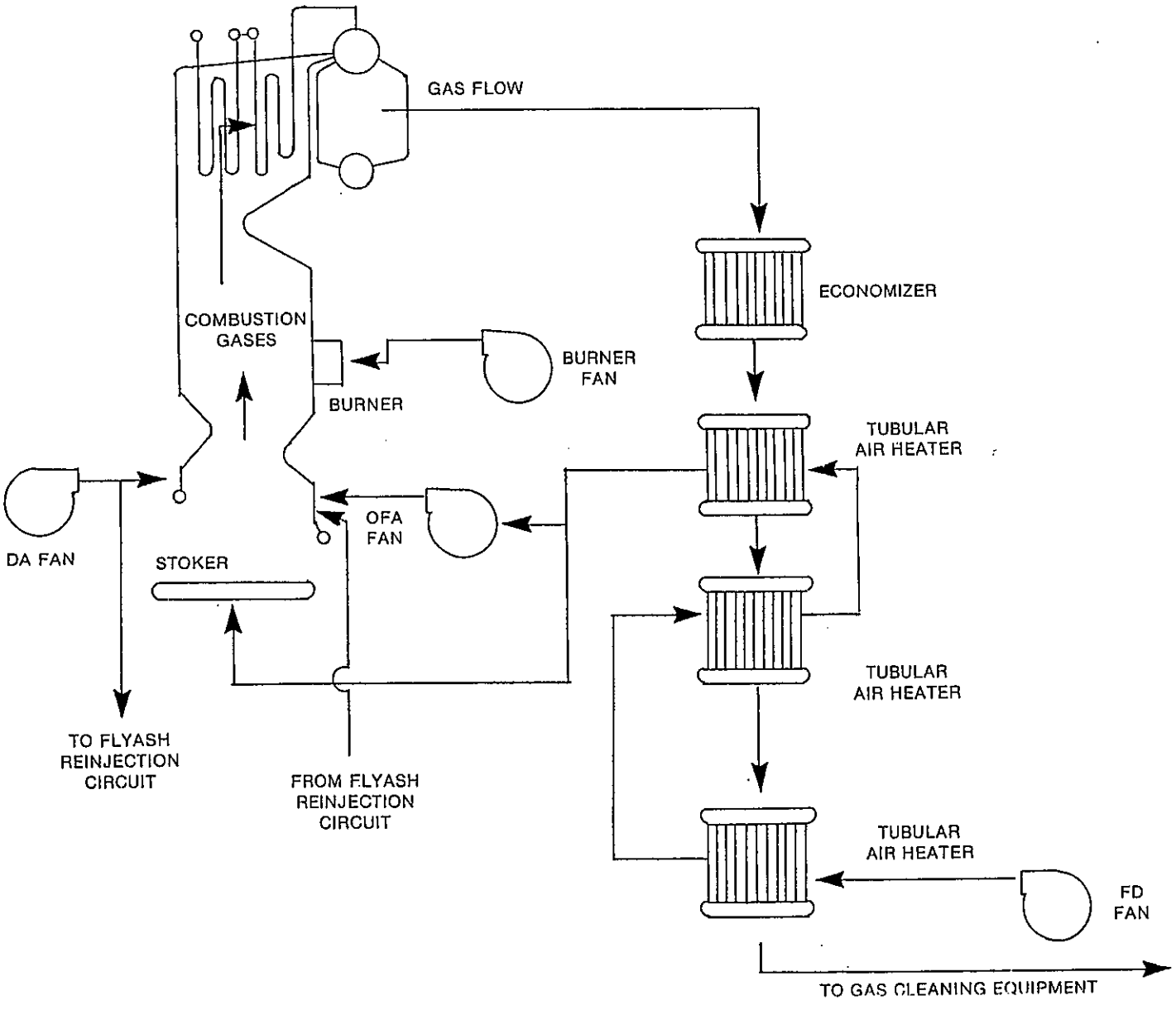


Figure 3. Air and Gas Flow

Combustion takes place in the furnace. The resultant hot gases flow upward releasing heat to the furnace waterwalls. Near the top of the furnace the heated gases pass over the radiant superheater and primary superheater tube bundles. From there the gas flows through the boiler bank tubes and is turned 90° downward by the boiler breeching, where it then travels through the economizer and 1st, 2nd and 3rd pass of the tubular air heater. The hot gases then pass through the gas cleaning equipment and induced draft fan before exiting through the stack to the atmosphere.

3.1 Forced Draft System

An electric motor driven forced draft fan with inlet box and silencer is located on the left hand side of the unit at the ground floor level.

3.2 Tubular Airheater

The three pass tubular airheater is located between elevations 28'-8" and 50'-0". In the tubular airheater, the combustion air is heated by the flue gases, before ducting to the undergrate air system and overfire air fan.

3.3 Overfire Air System

An electric motor driven overfire air fan is located on the left hand side of the unit at the ground floor level. The fan takes pressurized suction from outlet of the tubular airheater and increases the hot air's pressure before delivering it to the overfire air system.

The overfire air system consists of overfire air nozzles, which deliver a direct stream of air into the combustion zone of the furnace. The air creates a turbulent air flow, helps keep the ash on the grate and control emissions.

3.4 Distributor Air/Flyash Reinjection Systems

One electric driven distributor air/ cinder return fan discharges air simultaneously to an air manifold that distributes it to three, 24" pneumatic fuel distributors, and to the pneumatic flyash reinjection system.

3.5 Induced Draft Fan

The Induced draft fan takes the existing hot flue gas from the gas cleaning equipment and discharges it to the stack.

3.6 Soot Blowers

The steam soot blowing system utilizes steam from the superheater outlet as a blowing medium. The soot blower elements are electric motor operated and controlled by a Bergumatic, programmable controller, Control System.

Three Model PS-85E retractable sootblowers are mounted at the following locations: two between the radiant and primary superheater tube bundles at elevations 55'-6" and 63'-9"; and one between the primary superheater and boiler tube bank at elevation 61'-9".

Two model D-69-E Rotary Sootblowers are oppositely mounted on each side of the unit between the boiler tube banks at elevation 61'-11-1/2".

3.7 Setting

The unit is designed for balanced draft operation. Reinforcing buckstays and welded-wall construction assure rigidity under normal conditions. The forced draft fan and induced draft fan maintain a slight negative furnace pressure during boiler operation.

4.0 FUEL HANDLING SYSTEM

4.1 Riley Pneumatic Fuel Distributor System

The main components of the Pneumatic Fuel Distributor Air System are: distributor fans, modulating damper, distributor nozzle with adjustable vanes, and distributor tray.

Pressurized air from one electric motor driven hot distributor air fan delivers air to the distributor inlet. The air passes by the modulating damper, which creates a pulsating effect on the air stream before entering the distributor nozzles. The nozzle's shape causes an increased velocity in the air stream which drives the fuel from the distributor tray into the furnace. The adjustable air vanes in the nozzle help control the distributor of the fuel across the width of the furnace and grate.

5.0 FLYASH REINJECTION SYSTEM

5.1 Flyash Reinjection System

The main components of the pneumatic flyash reinjection system are extra heavy steel pipe conveying lines and supports, reinjection nozzles, airtight screen separators, high pressure air ducts, flyash pickup boxes.

Air from the distributor air/cinder return fan removes flyash from the economizer and dust collector hoppers and conveys it through the hard steel pipes into the furnace.

6.0 FUEL BURNING

6.1 Riley Harrington Traveling Grate Spreader Stoker

The traveling grate spreader stoker, located at elevation 11'-2" is designed for firing refuse fuel and arranged for front ash discharge.

6.2 Natural Gas Burner

A Peabody Engineering package auxiliary burner is located in the furnace side wall at elevation 32'-7".

1.0 WATER AND STEAM SYSTEM

1.1 Drum

Description	I.D. Inches	Shell Length	Material
Steam Drum	54"	20'-9"	SA-299
Lower Drum	42"	18'-9"	SA-299

1.2 Headers and Pipes

No.	and Description	O.D. Inches	Wall Thickness	Material
1	Econ. Feed Pipe	4	0.318	SA-106B
1	Econ. Inlet Hdr.	6-5/8	0.864	SA-106C
1	Econ. Outlet Hdr.	6-5/8	0.864	SA-106C
1	Econ. to Drum Pipe	4	0.318	SA-106B
2	DC -Drum to FWW Hdr.	12-3/4	0.844	SA-106B
2	DC Branch to S.W.W.	10-3/4	0.719	SA-106B
2	DC Branch to R.W.W.	10-3/4	0.719	SA-106B
1	Lwr. Front W.W. Hdr.	10-3/4	1.500	SA-106C
2	Lower Side W.W. Hdrs.	10-3/4	1.500	SA-106C
1	Lower Rear W.W. Hdr.	10-3/4	1.500	SA-106C
4	Upper Side W.W. Hdrs.	10-3/4	2.000	SA-106C
1	P.S.H. Outlet Header	10-3/4	1.125	SA-335P11
1	Spray Pipe B.F. Spray	8-5/8	0.593	SA-335-P11
1	Spray Pipe After Spray	8-5/8	0.593	SA-335-P11
1	Radiant S.H. Inlet Hdr.	10-3/4	1.125	SA-335-P11
1	Rad. S.H. Outlet Hdr.	12-3/4	1.750	SA-335-P11
1	S.H. Terminal Pipe	10-3/4	1.125	SA-335-P11

1.3 Tubes

Description	O.D. Inches	Wall Thickness	Material
Economizer	2	.150	SA-178C
Boiler Bank	2-1/2	.150	SA-178C
Front Waterwall	3	.180	SA-178C
Rear Waterwall	3	.180	SA-178C
Side Waterwall	3	.180	SA-178C
Waterwall Releases	5	.280	SA-178C
Primary Superheater	2-1/4	.165	SA-178C
	2-1/4	.180	SA-178C
	2-1/4	.220	SA-213-T11 T22
Radiant Superheater	1-1/2	.165	SA-213-T11
	1-1/2	.200	SA-213-T22

1.4 Valves and Fittings

For information and data on valves refer to the Valves and Fittings List, Drawing 91003-8-4700-10, 11 and 12; 91003-8-4701-10, Water Column/Gauge Glass Installation; and 91003-8-4702-10, Remote Drum Level Indicator Installation. These drawings may be found at the end of this section.

1.5 Steam Purifier

The steam purifying system consists of 14 centrifugal separators and a series of drier cartons that are 17' long.

Brian McMcDonald
↳ Raymond Simmon
5 Nepenset St.
Worcester MASS. 01606

2.0 AIR AND GAS SYSTEM

2.1 Forced Draft Fan

The Forced Draft Fan is a T.L.T. Babcock Model #18/50 RSK-V-1000/1120, SW-SI, Arrangement 3. It is designed with a 68.75" backward curved (single thickness airfoil) wheel operating at 1173 RPM. The fan is arranged for clockwise rotation, upblast discharge, and an inlet position of 20°.

The F.D. fan comes complete with an inlet box, variable inlet vanes for flow control, pneumatic V.I.V. operator w/positioner, ambient air cooled/greased lubricated roller type bearings mounted on independent pedestals and sole plates, flanged inlet and outlet connections, fan housing shaft seals, full flex gear type coupling and guard.

2.2 Distributor Air/Cinder Reinjection Fan

The Distributor Air/Cinder Reinjection Fan is a T.L.T. Babcock Model #15P-59, SW-SI, Arrangement 8. The fan is designed with a 26-1/8" dia. wheel operating at 3,570 R.P.M, and arranged for clockwise rotation, up-blast discharge, and an inlet box inlet position of 360 degrees.

The fan comes complete with an inlet box type silencer w/safety screen, variable inlet vanes for flow control, ambient air cooled/grease lubricated roller type bearings, access doors and drains, fan housing shaft seals, full flex gear type coupling with guard.

2.3 Hot Overfire Air Booster Fan

The Hot Overfire Air Booster Fan is a T.L.T. Babcock Model #18/50 RUK-IV-800, SW-SI, Arrangement 8. The fan is designed with a 57.5" dia. wheel operating at 1,763 R.P.M. It is arranged for clockwise rotation, bottom angular up 55° discharge and a flanged horizontal inlet position.

The fan comes complete with an inlet box, variable inlet vanes for flow control, pneumatic V.I.V. operator w/positioner, ambient air cooled/grease lubricated roller type bearings mounted on independent pedestals and soleplates, access doors and drains, flanged inlet and outlet connections, fan housing shaft seals, and full flex gear type coupling with guard.

2.4 Tubular Air Heater

The tubular air heater is made by Riley Stoker Corporation. The air heater consists of ASTM A513, 1010 unannealed steel tubing with a 2" O.D. and a .095 wall thickness. The flue gases flow through the tubes and the combustion air flows around the tubes.

2.5 Soot blowers

A complete soot blower system is made by Bergemann USA, Inc. and has a programmable controller with E-Prom memory for automatic sequencing and the following motor operated steam soot blowers:

- Three Model PS-85E retractable sootblowers suitable for a lance travel of approximately 17'-6"
- Two Model D-69-E rotary sootblowers having a lance length of approximately 8'-6"

2.6 Setting

The penthouse enclosure is externally insulated with mineral fiber insulation. The insulation on the roof is covered with #12 gauge flat galvanized steel, the insulation on the vertical front, rear and sides is covered with .032" ribbed embossed aluminum lagging.

The furnace front, rear and sides, exposed portions of the drums and waterwall headers, and the boiler bank sidewalls are externally insulated with the mineral fiber insulation. The insulation in these areas is covered with the .032" ribbed embossed aluminum lagging. Downcomers, economizer piping and exposed portions of the superheater terminal piping are also insulated with mineral fiber insulation and are covered with .020" flat aluminum lagging.

The mineral fiber insulation covering the airheater, economizer and air/gas ducts is enclosed with .032" ribbed embossed aluminum lagging.

3.0 FUEL FEED SYSTEM

3.1 Pneumatic Fuel Distributors

Three Riley Stoker Pneumatic Fuel Distributors are provided to distribute fuel to the Harrington Traveling Grate Spreader Stoker. Each distributor is equipped with a stainless steel adjustable tray, distributor air inlet section with distributor nozzles, fuel feed section with bottom liner of stainless steel in contact with the fuel, and fuel inlet piece with anti-flare back damper.

4.0 FUEL BURNING

4.1 Riley Harrington Traveling Grate Spreader Stoker

One 16'-0" wide x 23'-0" long Harrington Traveling Grate is furnished for this project. The unit is arranged for front ash discharge and consists of a heavy duty moving chain/grate surface assembly of heat-resistant alloy grate clips mounted on lateral rack bars which are attached to rugged cast roller chains.

The grate surface is supported by a framework of steel side frames and structural steel cross members, including the following components: a one-piece solid drive shaft with self lubricating split sleeve bearings mounted in cast iron bearing housings; eleven tooth drive sprockets bolted and keyed to the drive shaft; heavy duty chain link assemblies with center roller and two alloy side rollers mounted on an alloy steel pin; heavy duty rear track assemblies mounted on the rear girder to assure smooth travel of the chains; cast iron air seals to control air leakage between eight lateral air zone compartments, each equipped with an efficient internal discharge siftings removal system, and an individual air control damper to each zone.

The grate is powered by a Riley Model 83-HS Hydraulic Drive unit which is made up of two separate sub-units - a hydraulic power unit and a hydraulic mechanical drive unit. The hydraulic drive is coupled to the drive shaft of the traveling grate. The design of the drive allows for variable and controllable grate speeds which can range from 0-24 to 0-64 feet per hour.

4.2 Burners

Peabody Engineering is supply one #2 fuel oil package auxiliary burner. This total fuel burning system comes complete with the following: a stiffened steel windbox for ambient combustion air; a combustion air fan; electric motor drive, piezometer ring and inlet silencer; a combustion air flow control damper silencer; a combustion air flow control damper and drive; and one burner with oil atomizer.

4.3 Burner Management System

The Burner Management System is equipped with one (1) Riley free standing logic cabinet utilizing an Allen Bradley PLC-5/15 Processor plus all required I/O's, interposing relays, power supplies, lights, pushbuttons, etc.

5.0 PNEUMATIC FLYASH REINJECTION SYSTEM

5.1 Cinder Conveying Lines

The cinder conveying lines are constructed of extra heavy steel pipe and are arc based on the straight runs of pipe.

5.2 Riley Sand Separator

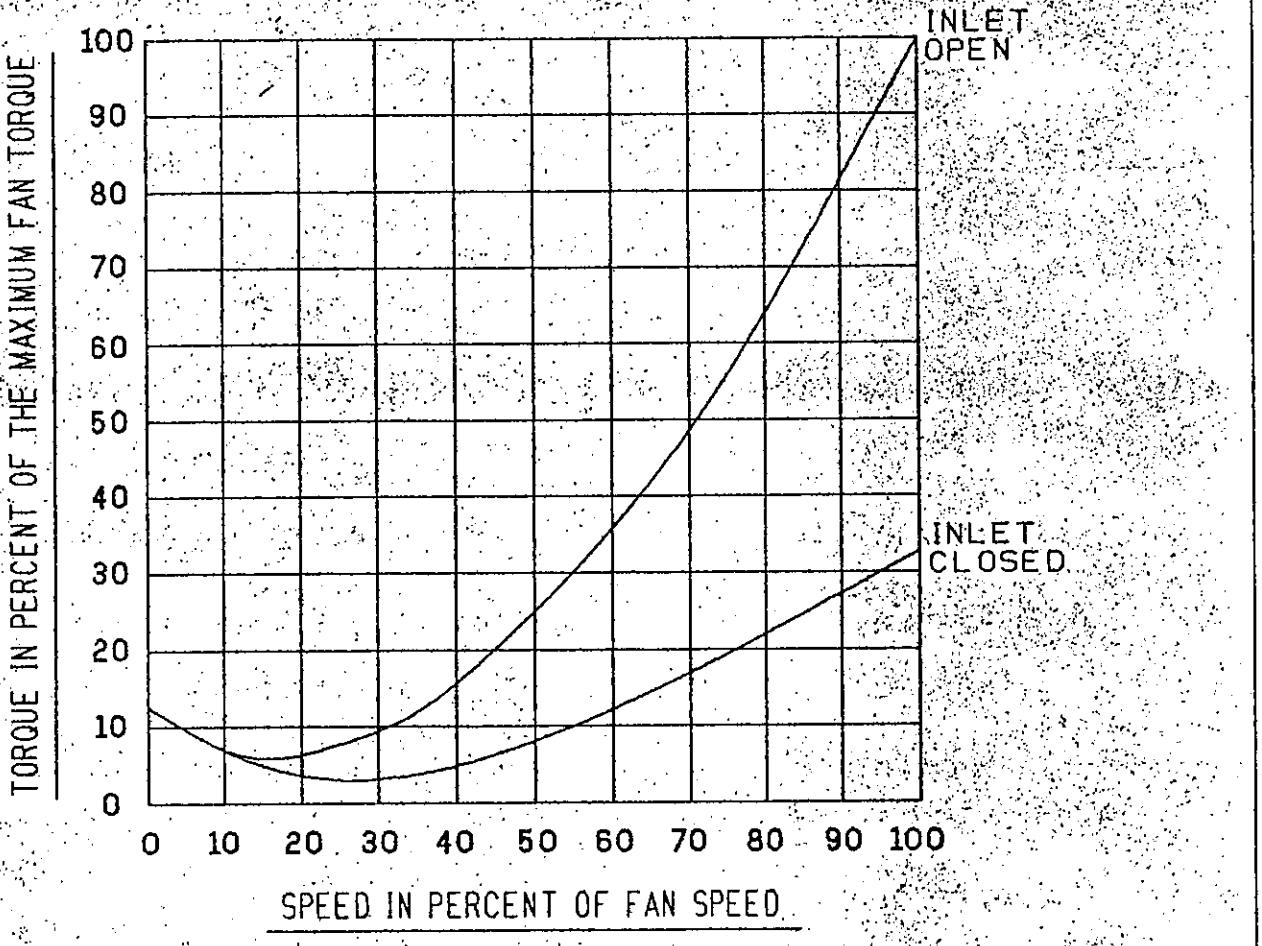
The Riley Sand Separator separates and discards the highly erosive, low carbon fly ash particles containing sand, while reinjecting the high carbon larger fly ash particles into the furnace.

Separation is obtained using a set of two shaking screens, with the upper 6" mesh screen retaining the large carbon containing particles for reinjection, while the lower 12" mesh screen passes the small (sand) particles to discard.

TLT-BABCOCK, INC.

REVISIONS			MICROFILM
DASH NO.	DATE	DESCRIPTION	ORIGINAL
			A

PROJECT : RILEY-CHATEAUGAY-FD
CUSTOMER : RILEY-STOKER-CORP
CUSTOMER PROJECT NO. : C-N-F---91003
CUSTOMER P.O. NO. : W-406502-91003
EQUIPMENT NO. : FORCED DRAFT FAN
FAN SIZE : 18/50 RSK-V-1000/1120/-1-CW (RBR=100)
FAN SPEED : 1180 RPM
MOMENT OF INERTIA : 5110 LB X FT2
POWER REQUIRED AT MAX. PT. : 330 BHP *
FAN TORQUE AT MAX. PT. : 1469 FT-LBS *



* AT INLET DENSITY 0.0655 LB/ACF - ADJUST FOR DENSITY AT STARTING CONDITIONS/TEMPERATURE.

THIS IS A CAD DRAWING
DO NOT REVISE MANUALLY

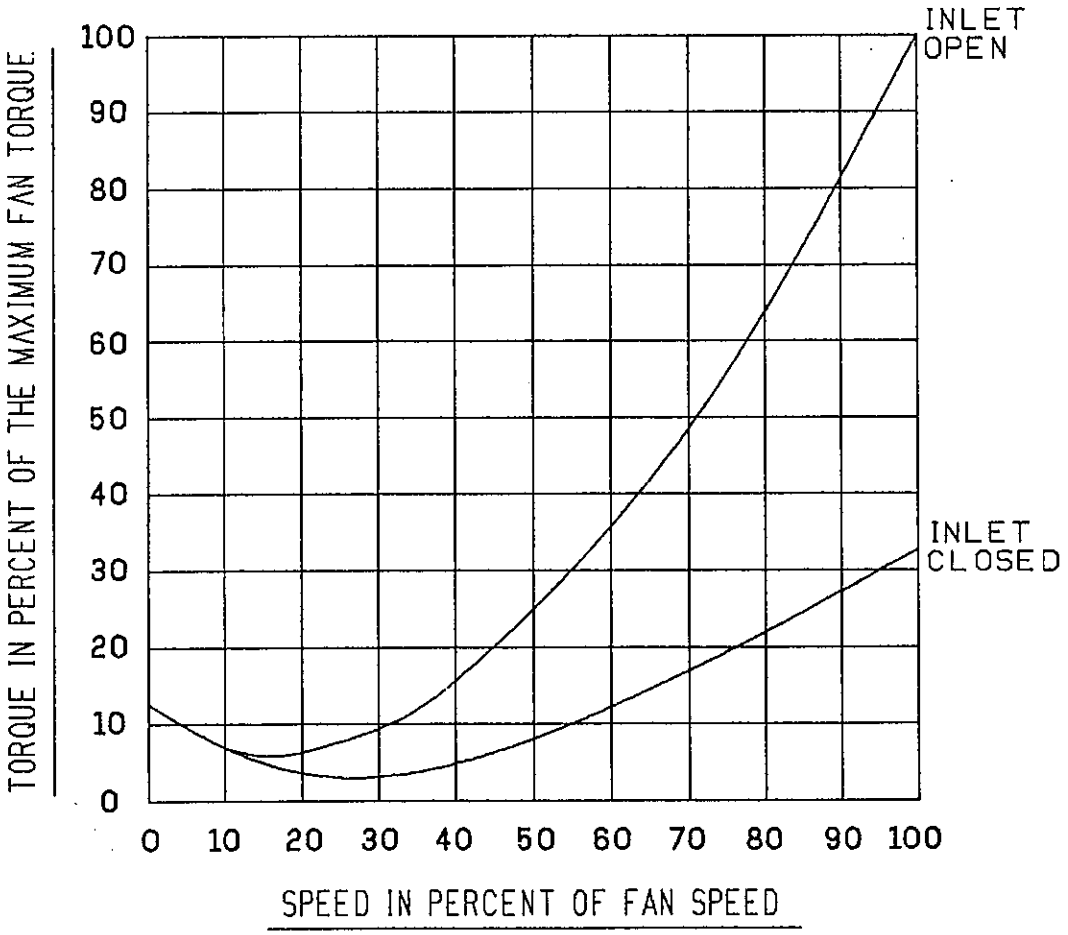
CACD PART NAME BSH.5780303.92.164021A00

578-0306		SPEED TORQUE CURVE 18/50 RSK-V-1000/1120/-1 CCW (RBR=100)	COMP 92
DWN. BY AUTO	CHKD DPO'D		SCALE DATE 05-21-91
PASSED BY	APPD DPO'D		DWG. NO. 164092 A-0

TLT-BABCOCK, INC.

REVISIONS			MICROFILM
DASH NO.	DATE	DESCRIPTION	ORIGINAL

PROJECT : RILEY-CHATEAUGAY-OFA
CUSTOMER : RILEY-STOKER-CORP
CUSTOMER PROJECT NO. : 91003
CUSTOMER P.O. NO. : W-406 502-91003
EQUIPMENT NO. : OVERFIRE AIR FAN
FAN SIZE : 18/50 RUK-IV-800/0 CW (RBR=100)
FAN SPEED : 1780 RPM
MOMENT OF INERTIA : 2333 LB X FT2
POWER REQUIRED AT MAX. PT. : 193 BHP *
FAN TORQUE AT MAX. PT. : 570 FT-LBS *



* AT INLET DENSITY 0.0401 LB/ACF - ADJUST FOR DENSITY AT STARTING CONDITIONS/TEMPERATURE.

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DO NOT REVISE MANUALLY

CADD PART NAME BSH.5780307.92.164133A00

578-0307		SPEED TORQUE CURVE 18/50 RUK-IV-800/0 CW (RBR=100)	COMP 92
DWN. BY PVC	CHKD		SCALE / DATE
PASSED BY	APPD. DPaul		DWG. NO. 164133 A-0

PLOT DATE 09-30-91