

5" O.D. x 74" Lg - 18 Ga. Admiralty Metal
66 - Inner Cond - 44 After Cond Tubes

WORTHINGTON 110 Total



STEAM-JET EJECTORS

WITH SURFACE INTER AND AFTER-CONDENSERS

Types CPH, CTH and CXH

INSTRUCTIONS FOR INSTALLATION AND OPERATION

AND

LIST OF PARTS

W-205-E10A

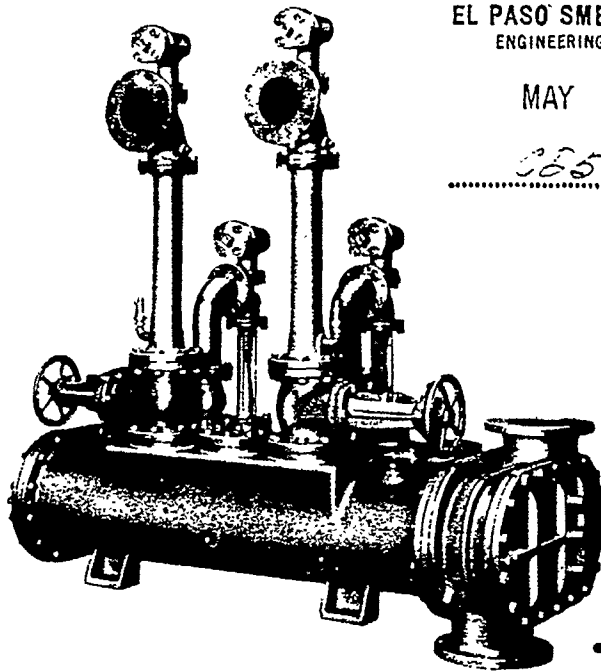
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Supersedes W-205-E10

EL PASO SMELTING WORKS
ENGINEERING DEPARTMENT

MAY 7 1947

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PLAINTIFF'S EXHIBIT

ASA-870

WORTHINGTON PUMP AND MACHINERY CORPORATION

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GENERAL INFORMATION

Description: The gas to be removed from a system flows into the inlet of the ejector and is entrained by a high velocity jet of steam. The steam has acquired a high velocity by expanding in a nozzle from a high to a low pressure. The jet of steam and gas mix and pass through the diffuser that is beyond the nozzle. The mixture is compressed in the diffuser and discharged from it at a higher pressure than that existing at the suction of the ejector.

Ejectors are designed with series staging depending upon the vacuum and steam economy desired. The stages are numbered progressively as the suction pressures increase.

Ejectors having more than one stage are designed with or without inter-condensers. The inter-condenser is used to decrease the steam consumption of the unit by condensing the steam used in the preceding stage and cooling the air entering the next stage. There are two types of condensers: Surface and jet. In the surface condenser, the steam is condensed and the air cooled by the transfer of heat through tubes of non-ferrous alloy to water passing through the tubes. In the jet condenser, the steam is condensed and the air cooled by direct contact with water. Either type of condenser can also be used as an after-condenser on the last stage. After-condensers serve merely to condense the steam from the last stage and have no effect on the overall steam consumption of the ejector.

The type of Steam-jet Ejector normally used for the removal of non-condensable gases from a high vacuum surface condenser serving a steam turbine-driven generating unit consists of two stages in series provided with surface inter- and after-condensers. The inter-condenser pressure is intermediate

between the main condenser pressure and atmospheric. The after-condenser is at atmospheric pressure. The steam condensed in the ejector condensers is usually returned to the main condenser and delivered into the main feedwater system by the hotwell pump.

Steam Pressure: The Steam-jet Ejector must be designed for the minimum steam pressure that may be encountered while in operation, as the unit will not operate on steam pressures lower than the design value. The guaranteed steam consumption is only obtained when the design steam pressure is maintained at the nozzles. Excessive steam pressure decreases the capacity of the ejector slightly because the diffuser throats are too small for the increased steam flow through the nozzles, which increases approximately in direct proportion to the increase in absolute steam pressure.

Condition of Steam: The Steam-jet Ejector must be supplied with dry saturated steam in order to obtain the maximum capacity. Wet steam is detrimental to the performance and the length of service that can be obtained from the steam nozzle. This is especially true of ejectors having small nozzle throat diameters. It is always advisable to install a steam purifier in the steam supply line to the ejector when the steam is wet.

A low degree of superheat is beneficial to the operation of an ejector as it assures dryness. High superheat does not improve the operation of an ejector, although efficient operation is obtained when the unit has been initially designed for superheated steam.

Pressure Regulation: The reduction of the main steam supply pressure to the operating steam pressure at the nozzles

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can be accomplished by one of the following methods:

1. Throttle valve
2. Orifice
3. Pressure reducing valve.

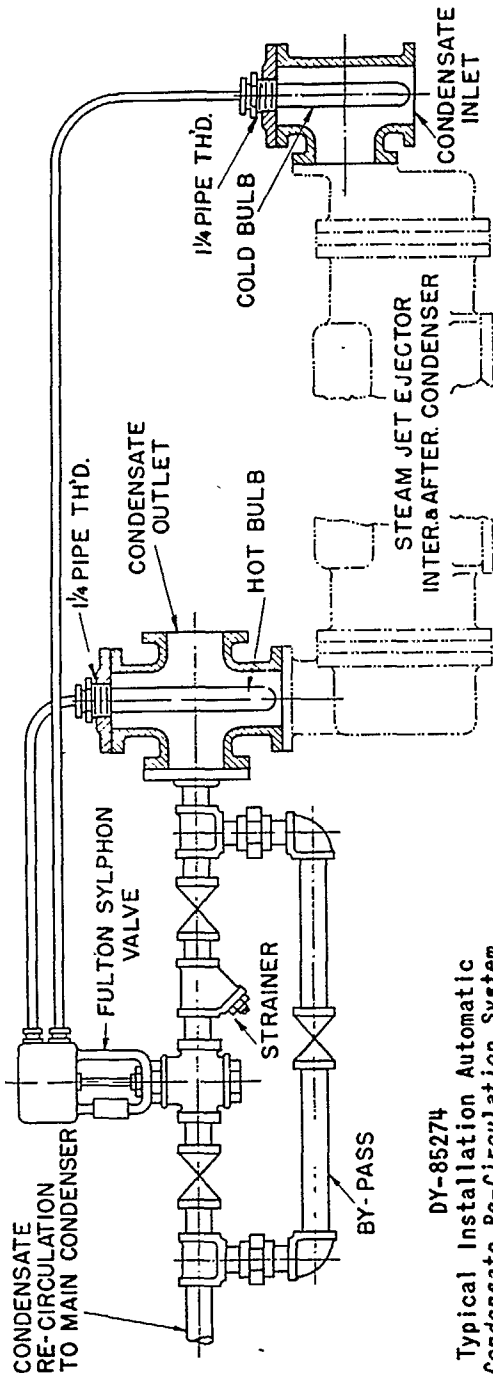
When the main steam pressure is fairly constant, an orifice or two throttle valves (one for regulation and the other for starting and stopping the ejector) should be used to maintain a constant steam pressure at the ejector nozzles. If the main steam pressure has any appreciable fluctuation, a pressure reducing valve should be used to maintain a constant steam pressure at the ejector nozzles. A reducing valve or orifice requires a steam strainer in the up-stream side and a valved by-pass around it to permit uninterrupted service in case the reducing valve or orifice does not operate properly.

Condensing Water: The Steam-jet Ejector must be designed to operate with the maximum water temperature and the minimum water flow that will be encountered while in operation. The condensing water for the inter- and after-condenser is usually condensate from the main condenser, with the ejector water spaces piped in series with the

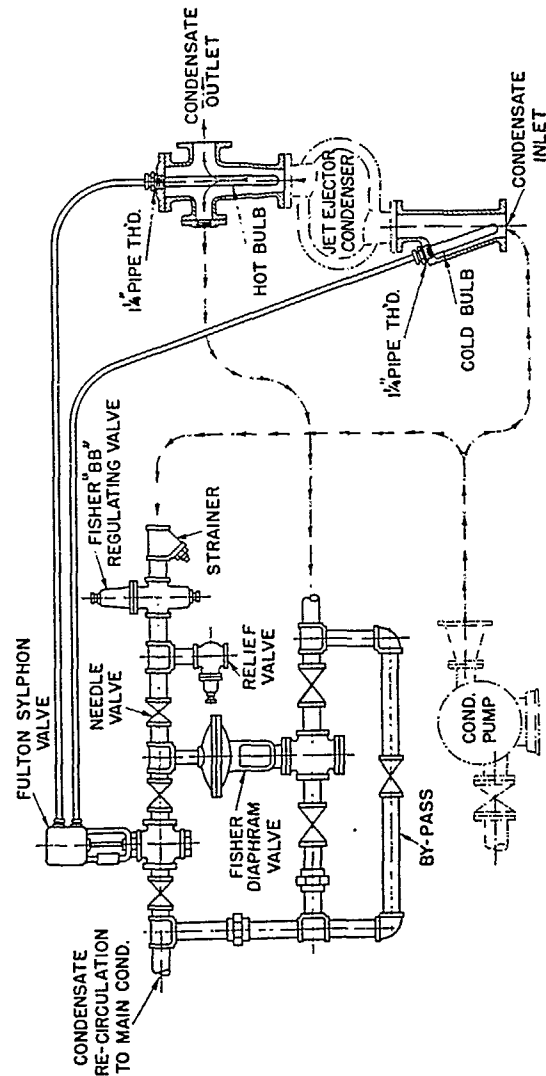
discharge line from the main condenser hotwell pump to the feedwater system. With this arrangement, the heat recovered in the inter- and after-condensers is conserved in the feedwater system.

Condensing Water at Light Loads: Frequently there is sufficient condensate from the main condenser at normal turbine loads, but insufficient at light turbine loads for proper condensing of the steam and cooling of the air in the ejector inter-condenser. To correct this, part of the condensate leaving the after-condenser can be by-passed to the main condenser for continuous recirculation by the condenser hotwell pump, until the quantity circulated through the ejector condensers is at, or above, the minimum recommended by Worthington. Operation in this manner can be either manual or automatic.

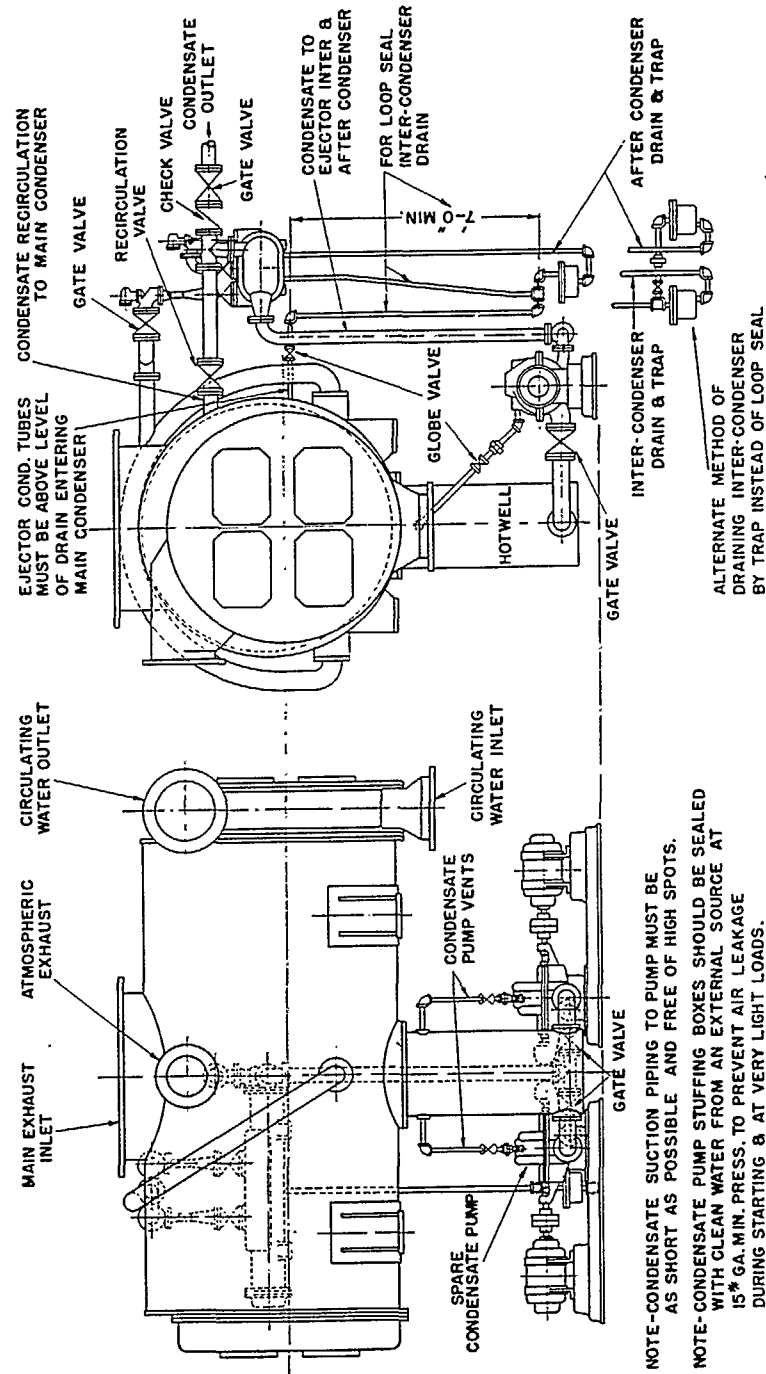
Evacuation of System During Starting Period: Worthington recommends the use of a single-stage, non-condensing, Steam-jet Ejector or Evacuator for rapid evacuation of the turbine and condenser steam space during the starting period. The evacuator may be mounted on the inter-condenser shell or on the air suction piping from the main condenser.



DY-85274
Typical Installation Automatic
Condensate Re-Circulation System



DY-85273
Typical Installation
Automatic Pilot
Operated Condensate
Re-Circulation System



NOTE-CONDENSATE SUCTION PIPING TO PUMP MUST BE AS SHORT AS POSSIBLE AND FREE OF HIGH SPOTS.
NOTE-CONDENSATE PUMP STUFFING BOXES SHOULD BE SEALED WITH CLEAN WATER FROM AN EXTERNAL SOURCE AT 15" GA. MIN. PRESS. TO PREVENT AIR LEAKAGE DURING STARTING & AT VERY LIGHT LOADS.

DX-85275
Typical Installation
Surface Condenser and Auxiliaries

INSTALLATION

Suction Piping: The suction piping must be as short and direct as possible. Low points in the piping where water will accumulate must be drained by a loop seal or vacuum trap. For a single-element ejector the piping must be at least the same diameter as the ejector suction; for a double element use one pipe size larger than each ejector suction diameter; for a triple element use two pipe sizes larger than each suction diameter.

A gate valve must be installed in front of each first stage to make it possible to isolate the first stages of a double or triple element ejector or to put a hydrostatic pressure test on the main condenser. For a typical piping installation see DX-85275, page 5.

All piping must be well supported to prevent any strain on the ejector.

Condensing Water Inlet Piping: Condensate from the main condenser is normally used in the ejector inter- and after-condensers. The piping between the hotwell pump discharge and the inlet to the ejector inter-condenser must be as short and direct as possible to eliminate excessive pressure drop. The piping should be at least the same diameter as the inlet connection on the ejector water box and should not interfere with the removal of condenser tubes. For typical piping installation see DX-85275, page 5.

Condensing Water Outlet Piping: This piping should be of liberal size and as direct as possible after leaving the ejector after-condenser water box. It should not interfere with the removal of condenser tubes.

Recirculation of Condensate: A typical installation of the recirculation line is shown on DX-85275, page 5. The inlet connection on the main condenser must be located above the center line of the condenser shell or at the top of main condenser hotwell. The condensate must

never be introduced into the air cooling section below the center of the condenser.

Automatic Recirculation of Condensate: Typical installations of automatic recirculation systems are shown on DY-85274 and DY-85273, page 4. The regulator is a two-bulb constant differential valve, with modulating control characteristics. It is generally designed to maintain a constant differential temperature of 15°F. across the ejector condensers.

The valve is reverse acting, opening with a downward movement of its stem. The differential temperature may be adjusted by turning the adjustment nut at the bottom of the spring. An upward movement of this nut reduces the temperature differential between the bulbs. Table 2, page 13 gives the approximate temperature differential for various scale settings. The stuffing box should be kept well packed and only finger tight.

The two bulbs must never be installed upside down. A valved by-pass line should always be installed around the valve to insure uninterrupted service.

The pilot operated recirculation system is necessary when 2" or larger valves are used. The differential valve becomes a pilot valve to control the water pressure on the diaphragm of the recirculation diaphragm valve.

In general the valve setting does not have to be changed if more than one element of the ejector is in operation.

Table 3, page 13 gives the pipe size for condensate recirculation lines for different size ejectors.

Inter-Condenser Drain: Where head room permits, the inter-condenser should be drained by a gooseneck or loop seal. This line should have a valve that will only be closed when putting a hydrostatic pressure test on the main con-

denser. The loop seal piping must be as straight as possible and only have right angle bends at the bottom of the loop and at the horizontal line to the main condenser. The vertical height of the loop seal measured from the bottom of the loop to the inlet on the main condenser should never be less than 7'-0".

The inlet connection of the loop seal drain on the main condenser can be in the top of the hotwell or above the center line in the shell depending upon the head room available. The connection must never be introduced into the air cooling section below the center of the condenser. The inlet connection of the main condenser must never be more than 2" above the level of the drain outlet on the ejector inter-condenser shell. For typical installation see DX-85275, page 5.

When head room is not available for a loop seal, a vacuum trap must be installed. The installation of the trap is shown on DX-85275, page 5. The inlet connection to the main condenser must never be more than 3 feet above the level of the drain outlet on the ejector inter-condenser shell.

On a three-stage ejector having two inter-condensers, the first inter-condenser will be drained to the main condenser by a loop seal or a vacuum trap, depending upon the head room available. The second inter-condenser will usually be drained by a vacuum trap.

The drain piping should be 3/4" or 1" pipe.

After-Condenser Drain: The after-condenser must be drained to the main condenser by a vacuum trap as shown on DX-85275, page 5.

The drain piping should be 3/4" or 1" pipe.

NOTE: All vacuum traps should be inspected before installing to see if floats are held in place during shipment, by wooden dowels. If present,

the dowel should be removed before the trap is put in operation.

After-Condenser Vent Piping: The after-condenser vent can be piped to the atmosphere, to the main condenser atmospheric relief line beyond the relief valve, or left to discharge into the room. The vent must never be connected to the condenser vacuum space.

When the air and water vapor are left to discharge into the room, the only time it might become objectionable is when first starting the ejector before condensate is supplied to the ejector condensers on ejectors having no evacuators.

If the vent is piped to any particular point the piping must be at least the same size as the connection on the after-condenser. The piping must be as short and direct as possible. At the lowest point in the pipe, a drain connection must be provided to prevent accumulation of water.

The piping must be installed so that the back pressure in the after-condenser will never exceed one pound gauge because an ejector will not operate against more than one pound gauge unless specially designed for higher back pressure.

Steam Piping: The steam piping should be of liberal size and be as direct as possible from the main supply line to the ejector to keep the pressure drop low. The off-take from the main supply line should be from the top or side of the pipe. The steam strainer, and orifice, reducing valve, or throttle valve must be located in this line as near the ejector as possible. The steam lines must be well supported, lagged, and drained with reliable steam traps. If the steam is wet, a reliable steam separator should be installed in this line.

Supports: All Steam-jet Ejectors must be rigidly supported and the inter- and after-condensers should set level when the unit is bolted on its foundation or supporting steel structure.

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OPERATION

General: Before the main condenser and auxiliaries are started the condenser, air piping and ejector should receive a water pressure test to reveal any air leaks. These must be made tight. Also, before starting up an ejector, all steam piping must be blown out thoroughly with steam or compressed air to remove all chips, scale, etc.

Whenever an ejector is in operation the steam pressure maintained at the nozzles must be at, or above, the minimum steam pressure stamped upon the nameplate. Actually the steam pressure at the ejector nozzles should be maintained at about ten pounds gauge above the minimum operating pressure, to allow for slight pressure fluctuations.

The first stage must never be started by itself or started without condensing water flowing through the inter-condenser.

Unless the ejector is designed for a specific back pressure, the back pressure on the last stage must be below one pound gauge.

A parts list and cross-section of a Type CPH Single element, two-stage, Steam-jet Ejector with surface inter- and after-condensers is shown on DR-81397, page 14, and a Type CTH Double element unit on DR-85236, page 16.

Starting Two-Stage, Single Element Ejector Having Evacuator Installed on the Inter-Condenser Shell:

Worthington Type CPH Steam-jet Ejector.

DY-76310, page 15, shows a typical elevation of this unit.

Before starting the evacuator and second stage, open the following valves.

1. Evacuator discharge valve.
2. Evacuator suction valve.
3. Valve in loop seal drain or vacuum trap drains.
4. Suction valve in front of first stage.

Next turn on the steam to the evacuator and second stage maintaining the steam pressure at or about 10 lb. gauge above the minimum pressure stamped upon the nameplate.

During the evacuation period the turbine is started and as the turbine speed increases the low-pressure seals become effective. After the introduction of steam to the main condenser, condensate can be supplied to the inter- and after-condenser.

When the pressure in the main condenser is approximately 10" Hg. absolute and condensate is flowing through the ejector condenser tubes, turn the steam on the first stage. The ejector will now evacuate the system to the highest vacuum obtainable with existing conditions.

Stopping Evacuator and Leaving Two-Stage Ejector Operating: The evacuator should now be shut down by closing the following valves in the order given.

1. Evacuator suction valve.
This valve must always be closed before the steam is shut off.
2. Evacuator steam valve.
3. Evacuator discharge valve.
This valve must never be closed before the steam is shut off.

If the ejector will not maintain the vacuum see page 11 for causes of failure to determine what is causing the loss in vacuum.

Starting Two-Stage, Multi-Element Ejector Having Evacuator Installed on the Inter-Condenser Shell:

Worthington Type CTH and CXH Steam-jet Ejectors.

DX-76313, page 17, shows a typical elevation of a CTH, and DR-76312, page 18, of a CXH ejector.

DX-76311, page 19, shows typical steam piping with throttle valves or orifices for reducing the main steam pressure to the operating pressure.

Before starting the evacuator open the following valves:

1. Evacuator discharge valve.
2. Evacuator suction valve.
3. Valves at discharge of all first stages.
These valves should be open at all times unless working on a particular stage while part of the ejector is operating.
4. Suction valve in front of all first stages.
5. Valve in loop seal drain or vacuum trap drains.

The valves in front of the second stages must be closed tight unless the second stages are started with the evacuator and this should not be necessary.

Next turn on the steam to the evacuator maintaining the steam pressure at, or about 10 lb. gauge above, the minimum pressure stamped upon the nameplate.

During the evacuation period the turbine is started and as the turbine speed increases the low pressure seals become effective. After the introduction of steam to the main condenser, condensate can be supplied to the inter- and after-condensers.

When the pressure in the main condenser is approximately 10" Hg. ab-

solute and condensate is flowing through the ejector condenser tubes, start one or more elements by opening the valves on the elements being started, in the order given. Refer to DX-76313, page 17.

1. Valves at discharge of second stages (when furnished).
These valves must always be opened before turning the steam on the second stages.
2. Turn steam on second stages.
With steam piping having reducing orifices, the valve (No. 1) in bypass must be closed and the valves (No. 2) on the down-stream side of orifices should be opened before opening the up-stream valve (No. 3). The first stage valves (No. 4) should be closed. (See DX-76311, page 19.)
3. Open valves in front of second stages. These valves must never be opened before turning steam on the second stages.
4. If only one first stage of a multi-element ejector is started be sure suction valves in front of first stage not being started are closed tight.
5. Turn steam on first stages.

The ejector will now evacuate the system to the highest vacuum obtainable with existing conditions.

After the turbine is on load, one ejector element should maintain as good a vacuum at the turbine exhaust as that secured by operating all elements. If this is not the case see page 11 for causes of failure, to determine what is causing the loss in vacuum.

The evacuator should now be shut down by closing the valves as explained on page 8.

Stopping One Element: Shut off the element not required by closing the following valves in the order given. Refer to DX-76313, page 17. Do not close any valves on the element being left in operation.

1. Suction valve in front of first stage.
This valve must always be closed before the steam is shut off.
2. Steam valve on first stage.
3. Valve in front of second stage.
This valve must always be closed before the steam is shut off.
4. Steam valve on second stage.
With steam piping having reducing orifice, close steam valve (No. 3).

The element is now out of service.

Starting One Element While Other is Operating: Open the valves on the element to be started in the following order:

1. Valves at discharge of second stage (when furnished).
This valve must always be opened before turning steam on second stage.
2. Turn steam on second stage.
3. Open valve in front of second stage.
This valve must never be opened before turning steam on the second stage.
4. Open valve at discharge of first stage.
This valve must always be opened before turning steam on the first stage.
5. Turn the steam on first stage.
6. Open valve in front of first stage.
This valve must never be opened before turning steam on the first stage.

This assumes that the condensing water has increased sufficiently to properly condense the steam and cool

the air in the ejector inter-condenser. Refer to Table 1, page 13 for the approximate quantities of condensing water required.

The element is now in operation.

Stopping Ejector: Close the main steam valve, shutting the steam off all stages at once. Close first-stage steam valves. Shut off water supply to ejector condensers.

Starting Two-Stage Ejector Having Evacuator Installed on First Stage Suction Manifold: The evacuator and ejector are started by following the same procedure as explained on page 9 when the evacuator is installed on the inter-condenser. However, as soon as the first stages are started, the evacuator must be shut off immediately as explained on page 8.

Starting Manual Condensate Recirculation at Light Loads: Table 1 on page 13 gives the approximate minimum condensing water necessary for the standard Worthington Steam-jet Ejector. When the flow of condensing water from the main condenser hotwell is below this quantity, open the valve on the recirculation line, see DX-85275, page 5. The amount that this valve should be opened can only be determined by observing the effect upon the main condenser vacuum or inter-condenser vacuum. A table of approximate inter-condenser absolute pressures is given on page 12.

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EJECTOR FAILURE

CAUSES

- ** 1. Steam pressure at nozzles below design pressure stamped on name-plate.
- * 2. Superheat other than design valve.
- * 3. Wet steam.
- * 4. Improper operation of pressure reducing valve.
- * 5. Clogged orifice in steam supply line.
- * 6. Clogged ejector steam nozzles.

High pressure nozzles are more apt to clog than low pressure nozzles because the nozzle throats become smaller as the nozzle steam pressure increases. The same is true of saturated steam versus highly superheated steam.

The proper way to clean the ejector steam nozzles and nozzle head strainers is to remove the complete nozzle head assembly. Next remove the steam strainer by removing the nozzle head cover. Then blow out the chips or scale with compressed air from the steam nozzle end, in order that the foreign material will be blown out the steam inlet. It is also advisable to blow out the steam piping while the ejector is out of service.

- 7. End of ejector steam nozzle jammed. The steam nozzles must be handled carefully to prevent jamming the exit, because if dented, the efficiency of the ejector is re-

duced. The dents must be straightened or the nozzle replaced by a new one before the nozzle is put back in the ejector.

- ** 8. Insufficient condensing water passing through the inter-condenser.

This causes an overloading of the stage removing the air from the inter-condenser due to insufficient cooling of the air.

- 9. Broken condenser tube.
- 10. Leaky packing on condenser tubes.
- 11. Clogged loop seal drain pipe.
- * 12. Loop seal drain too short.

This causes a short circuit of air between the main condenser and the inter-condenser. See DX-85275, page 5, for correct installation.

- * 13. Excessive temperature of condensing water.
- ** 14. Improper operation of vacuum trap.
- 15. Excessive back pressure on last stage.

- ** 16. Air leakage into system too high.
- 17. Excessive temperature of vapors entering first stage of ejector.
- 18. If the condensing equipment has been installed for sometime in a power house it is quite often that poor condenser vacuum is blamed upon the Steam-jet Ejector, when actually the poor vacuum is caused by dirty condenser tubes. Therefore, after eliminating the most common causes of ejector failure without locating the trouble, inspect the main condenser for dirty tubes.

Note: ** These represent the most common causes of ejector failure.

* These represent the next most common causes of ejector failure.

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In general the inter-stage absolute pressure of a two-stage ejector should be as follows:

1st Stage Design Pressure "Hg. Abs.	2nd Stage Inlet Pressure "Hg. Abs.
1	5.0 to 5.5
1.5	6.0 to 6.5
2	6.5 to 7.0
2.5	7.0 to 7.5
3	7.5 to 8.0
4	9.0 to 10.0

If the ejector does not operate properly install a reliable vacuum manometer on the inter-condenser and see if the inter-stage absolute pressure checks the values given in above table (the absolute pressure equals the vacuum

reading subtracted from the barometer reading). If it does not, then the trouble is in the second stage. If it does, then the trouble is in the first stage. This assumes that condensing water quantity, steam pressure, etc., have been eliminated as the cause of failure.

The bodies of most Worthington Steam-jet Ejectors have plugged openings where connections for vacuum gauges can be installed.

The above table is approximate and varies with different ejectors depending upon the condensing water temperature and quantity of air being handled. However, in most cases, the inter-stage absolute pressure is within the values given.

DATA NEEDED BY WORTHINGTON FOR LOCATING OPERATING TROUBLES

When writing to Worthington for assistance in locating causes of failure please send in the following information:

1. Serial number of Steam-jet Ejector stamped on nameplate.
2. Barometer reading.
3. Vacuum in main condenser.
4. Vacuum in inter-condenser.
5. Pounds of steam being condensed in main condenser.
6. Circulating water inlet and outlet temperature of main condenser.
7. Steam pressure and temperature at Steam-jet Ejector nozzles.
8. If inter-condenser flooding, send sketch showing method of draining.

9. Detailed description of complaint.

With this information we can more intelligently analyze your trouble and render more satisfactory service.

ORDERING REPAIR PARTS

When ordering repair parts be sure to give the following information:

1. Serial number of Steam-jet Ejector stamped on nameplate.
2. Name of part being replaced and stage number.

Obtained from Parts List on DR-81397, page 14, for CPH units and on DR-85236, page 16, for CTH units.

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TABLE 1

SIZE EJECTOR	NO. OF WATER PASSES IN EJECTOR CONDENSERS	LOCATION OF WATER BOX NOZZLES	MINIMUM CONDEN- SATE PER ELEMENT	MINIMUM CONDEN- SATE TWO ELEMENTS
3-CPH	5	Opposite	25	
4-CPH	3	Ends	35	
4-CPH	2	Same	75	
6-CPH	2	Ends	140	
6-CPH	1	Opposite	300	
8-CPH	1	Ends	400	
3-CTH	5	Opposite	25	50
4-CTH	3	Ends	35	70
4-CTH	2	Same	75	100
6-CTH	2	Ends	140	175
6-CTH	1	Opposite	300	375
8-CTH	1	Ends	400	475

Above table gives approximate minimum condensing water requirements for standard Worthington Steam-jet Ejectors.

TABLE 2

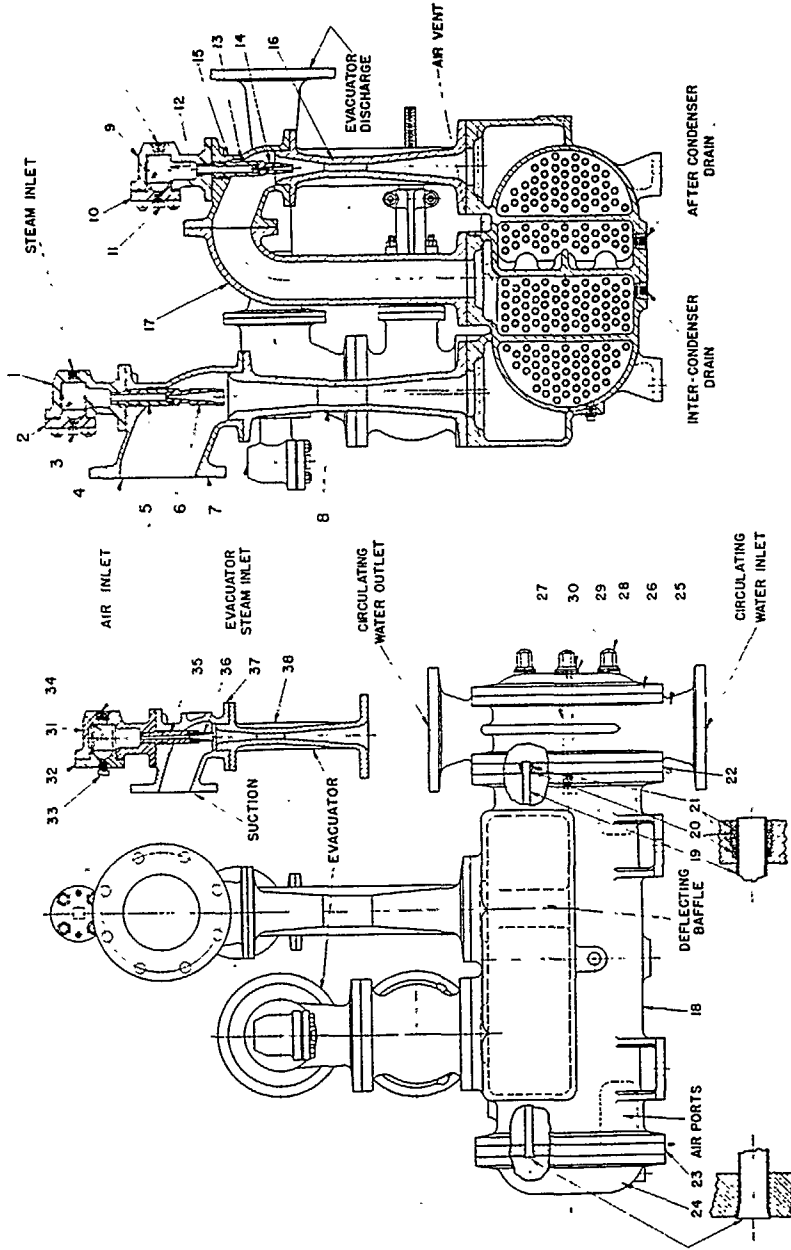
SCALE SETTING	APPROX. BULB DIFFERENTIAL
-	°F.
0	22
1	19
2	16
3	13
4	10
5	7
6	3

Above table gives approximate bulb temperature differential for scale settings on Fulton Syphon Recirculation Valve.

TABLE 3

SIZE EJECTOR	NO. OF WATER PASSES IN EJECTOR CONDENSERS	LOCATION OF WATER BOX NOZZLES	SIZE CONDENSATE RE-CIRCULATION LINE DIAMETER OF PIPE IN INCHES
3-CPH	5	Opposite	1½
4-CPH	3	Ends	2
4-CPH	2	Same	3
6-CPH	2	Ends	4
6-CPH	1	Opposite	6
8-CPH	1	Ends	6
3-CTH	5	Opposite	2
4-CTH	3	Ends	3
4-CTH	2	Same	3
6-CTH	2	Ends	4
6-CTH	1	Opposite	6
8-CTH	1	Ends	8

Above table gives pipe sizes for condensate re-circulation lines for standard Worthington Steam-jet Ejectors.



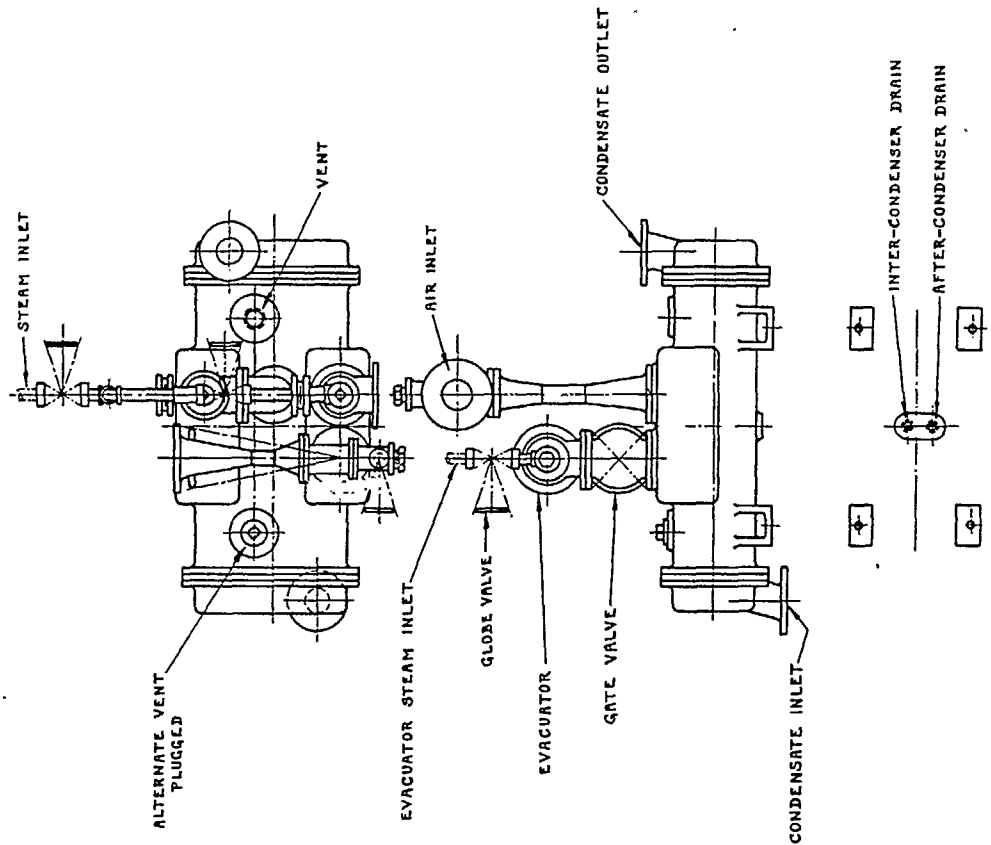
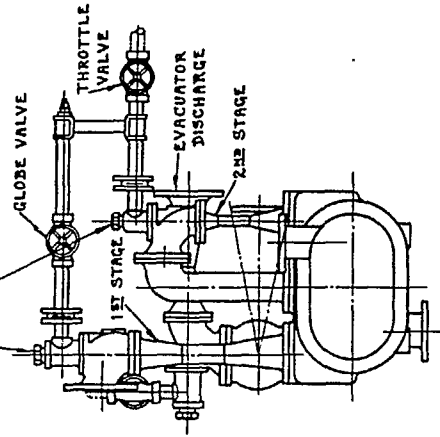
DR-81397 - Type CPH Ejector - Sectional Elevation

LIST OF PARTS

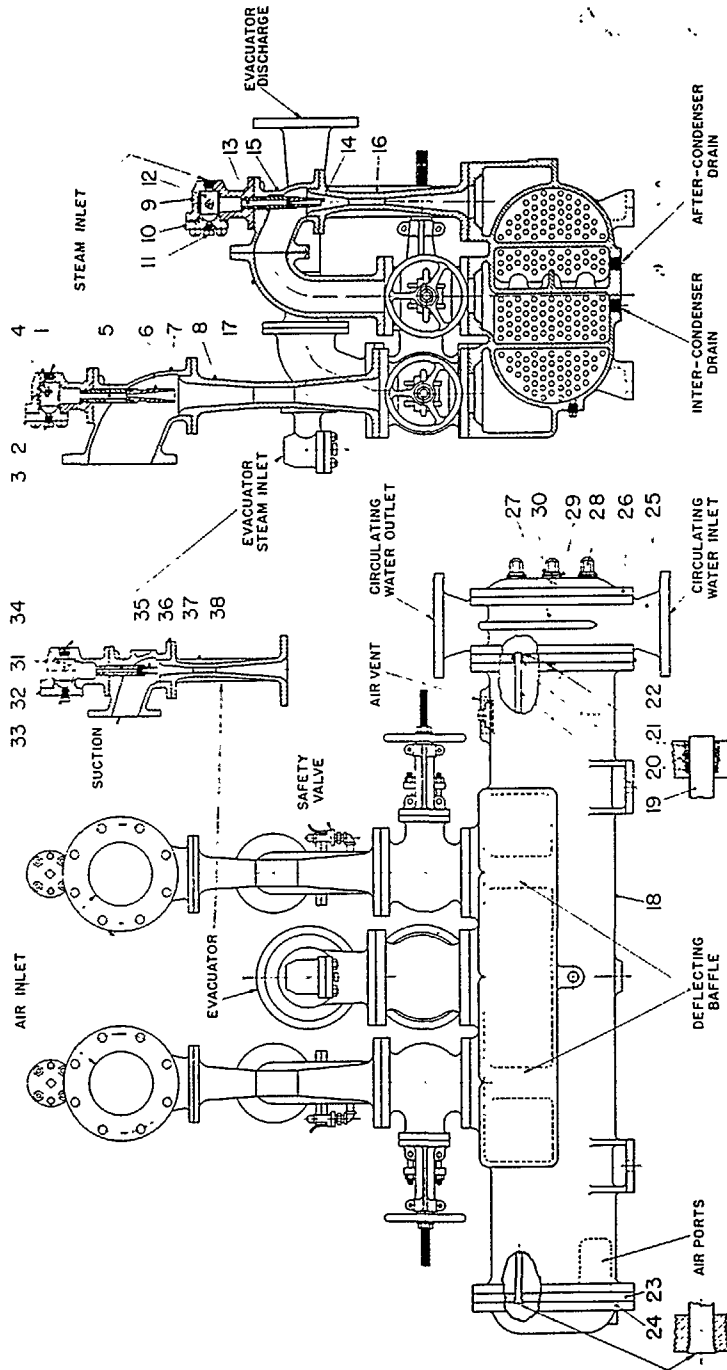
1st STAGE		2nd STAGE		INTER AND AFTER-CONDENSER		EVACUATOR	
Part No.	Name of Part	Part No.	Name of Part	Part No.	Name of Part	Part No.	Name of Part
1	Nozzle Head	9	Nozzle Head	24	Crown Head	31	Nozzle Head
2	Nozzle Head Cover Plug	10	Nozzle Head Cover	25	Water Box	32	Nozzle Head Cover
3	Nozzle Head Cover Plug	11	Nozzle Head Cover	26	Fibre Tube Packing	33	Nozzle Head Cover Plug
4	Nozzle Head Extension	12	Nozzle Head Extension	27	Stay Bolt	34	Nozzle Head Strainer
5	Nozzle Head Extension	13	Nozzle Head Extension	28	Tube Head (R.H.)	35	Nozzle Head Extension
6	Nozzle Head Extension	14	Nozzle Head Extension	29	Lead Washer	36	Nozzle Head Extension
7	Nozzle Head Extension	15	Nozzle Head Extension	30	Steel Washer	37	Body
8	Diffuser	16	Diffuser			38	Diffuser
		17	Elbow				

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NOTE:- THESE TWO NOZZLE HEADS ARE
EQUIPPED WITH INTERNAL STEAM STRAINERS



DY-76310
Type CPH Ejector
Typical Elevation

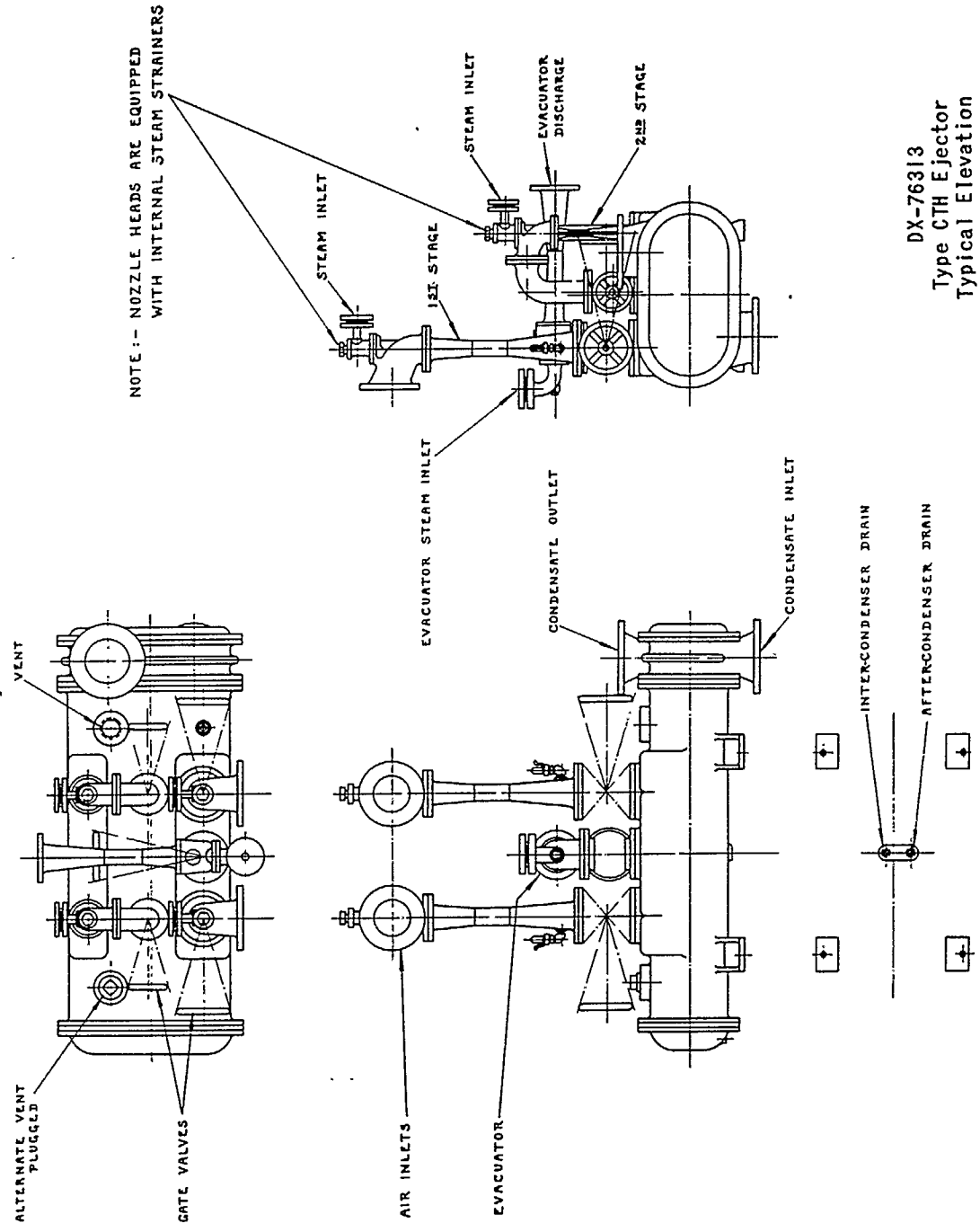


DR-85236 - Type CTH Ejector - Sectional Elevation

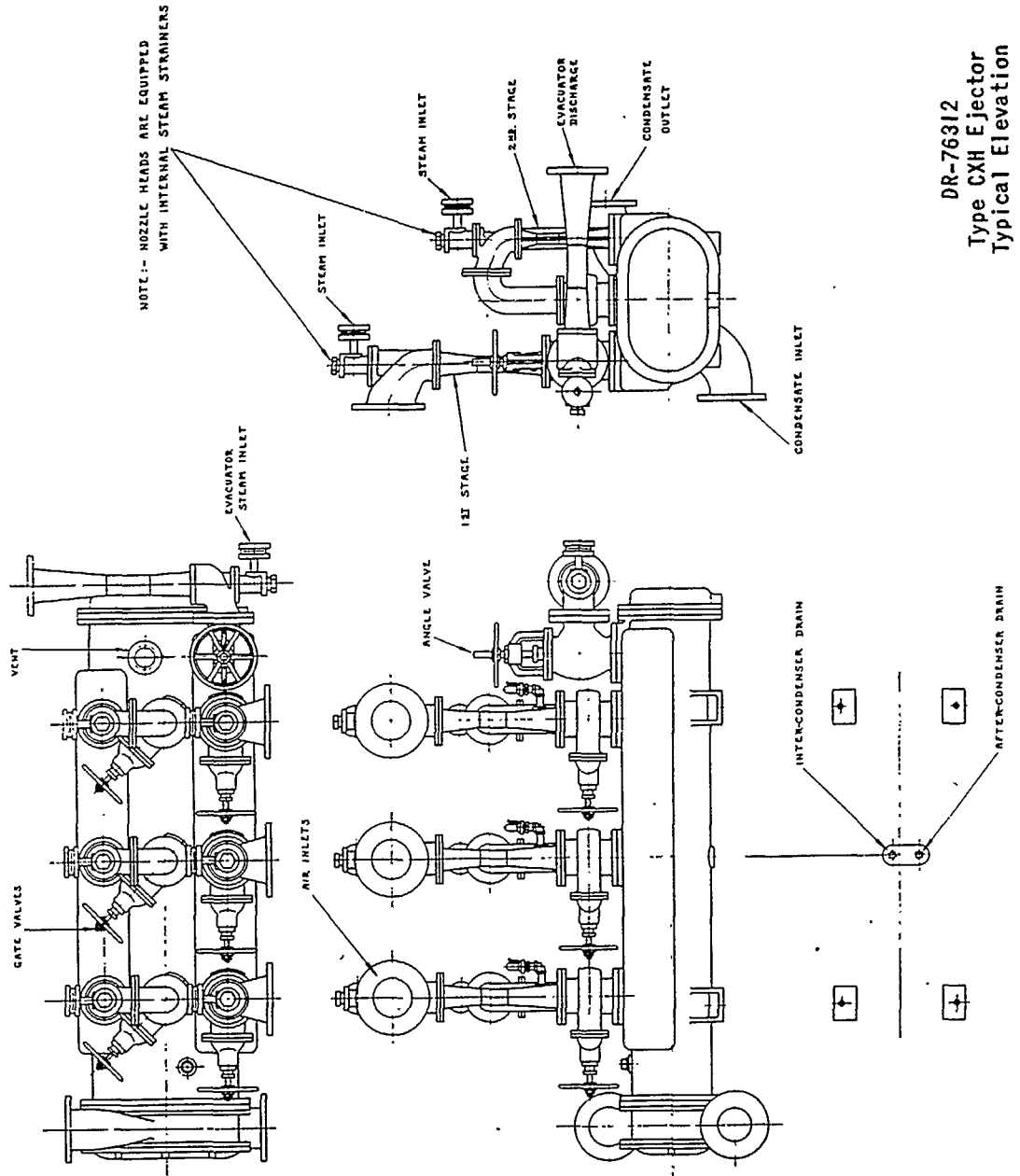
LIST OF PARTS

1st STAGE		2nd STAGE		INTER AND AFTER-CONDENSER		EVACUATOR	
Part No.	Name of Part	Part No.	Name of Part	Part No.	Name of Part	Part No.	Name of Part
1	Nozzle Head	9	Nozzle Head	24	Crown Head	31	Nozzle Head
2	Nozzle Head Cover	10	Nozzle Head Cover	25	Water Box	32	Nozzle Head Cover
3	Nozzle Head Cover Plug	11	Nozzle Head Cover Plug	26	Fibre Tube Packing	33	Nozzle Head Cover Plug
4	Strainer	12	Strainer	27	Tube Head (R.H.)	34	Nozzle Head Strainer
5	Nozzle Extension	13	Nozzle Extension	28	Tube Head (L.H.)	35	Nozzle Extension
6	Nozzle	14	Nozzle	29	Tube Head (L.H.)	36	Nozzle
7	Body	15	Body	30	Steel Washer	37	Body
8	Diffuser	16	Diffuser			38	Diffuser

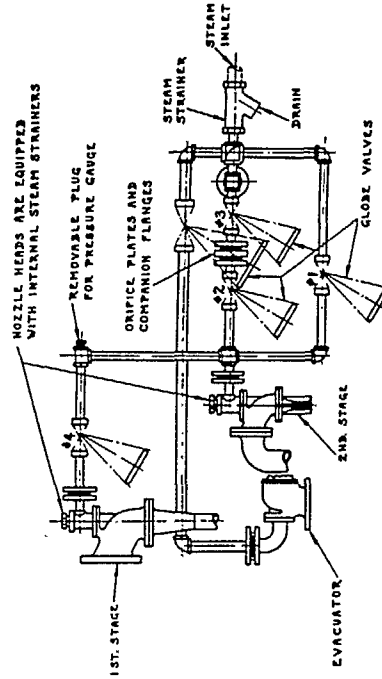
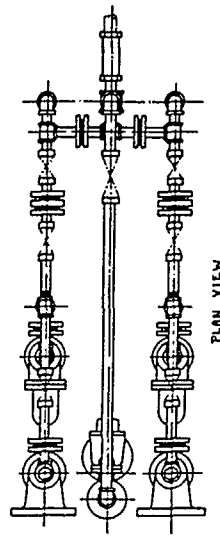
WORTHINGTON



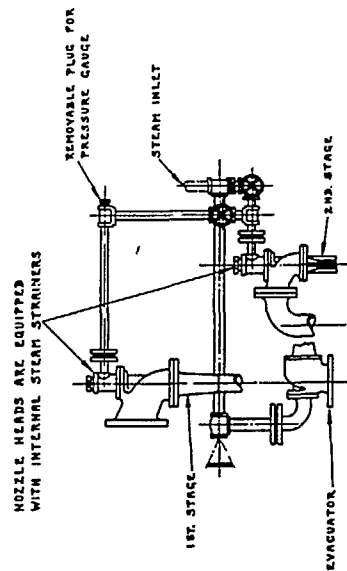
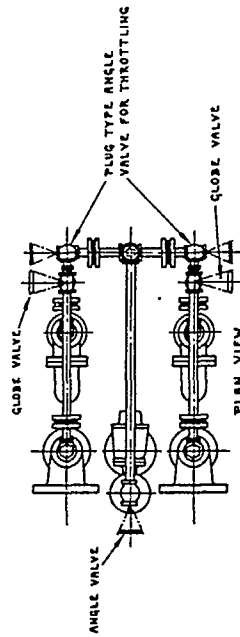
DX-76313
Type CTH Ejector
Typical Elevation



DR-76312
Type CXH Ejector
Typical Elevation



TYPICAL STEAM PIPING WITH ORIFICES
FOR CTH STEAM JET EJECTOR



TYPICAL STEAM PIPING WITH THROTTLE VALVES
FOR CTH STEAM JET EJECTOR

DX-76311
Typical Steam Piping For
CTH Steam-Jet Ejector