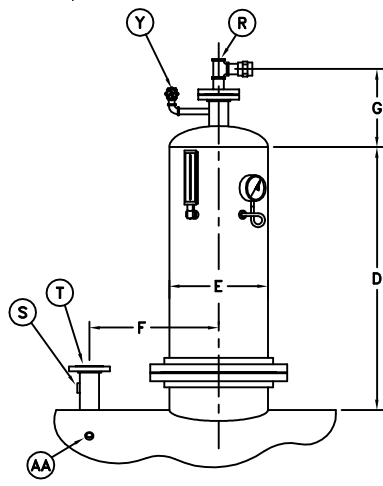


FRONT VIEW
UNITS 14MT THRU 125MT

SIDE VIEW



ALTERNATE FRONT VIEW
UNITS 3.5MT THRU 11MT

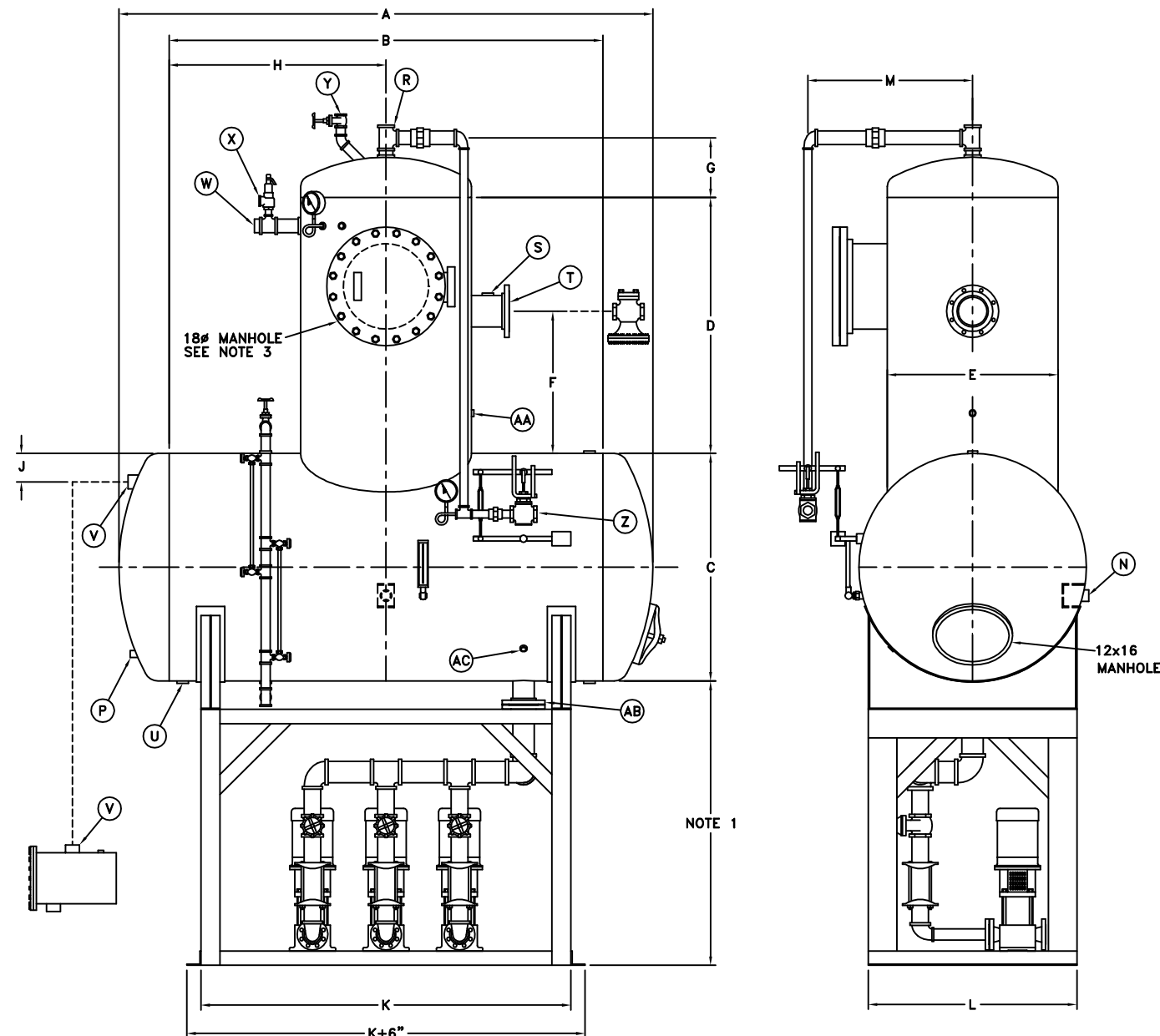
NOTES

1. DETERMINED BY SPECIFIC PUMP REQUIREMENTS.
2. STORAGE CAPACITY TO OVERFLOW.
3. SIZES 3.5MT THRU 11MT WILL HAVE TRAY ACCESS THROUGH COLUMN FLANGE (SEE ALT. FRONT VIEW)
4. ALL DIMENSIONS IN INCHES.
5. THIS DRAWING NOT FOR CONSTRUCTION PURPOSES.

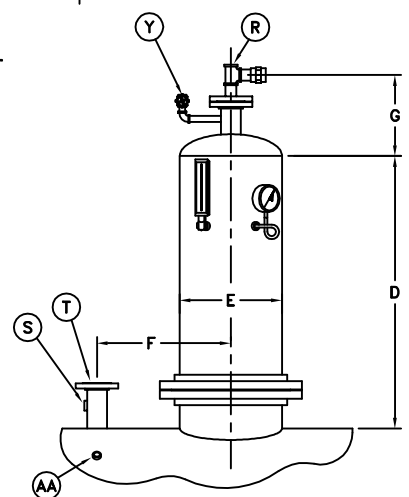
MODEL NO.	3.5MT	5MT	7MT	9MT	11MT	14MT	18MT	21MT	24MT	30MT	40MT	50MT	70MT	80MT	90MT	100MT	125MT	
CAP-LBS/HR	3,500	5,000	7,000	9,000	11,000	14,000	18,000	21,000	24,000	30,000	40,000	50,000	70,000	80,000	90,000	100,000	125,000	
STORAGE CAPACITY (NOTE 2)	MINUTES	21	15	11	10	11	12	12	10	12	10	10	10	11	10	11	10	10
	GALLONS	150	150	150	182	245	276	418	418	592	592	793	1028	1596	1596	1928	2094	2615
A (APPROX)	63	63	63	75	99	111	113	113	116	116	118	120	125	125	127	169	185	
B STORAGE STRAIGHT LENGTH	48	48	48	60	84	96	96	96	96	96	96	96	96	96	96	140	154	
C STORAGE DIAMETER	30	30	30	30	30	30	36	36	42	42	48	54	66	66	72	66	72	
D DEAERATOR STRAIGHT LENGTH	48	48	48	48	48	48	54	54	54	54	54	54	54	54	54	42	42	
E DEAERATOR DIAMETER	18	18	18	18	18	24	30	36	36	36	36	42	48	54	54	54	60	
F	19	19	19	18	19	30	30	30	30	30	30	30	30	30	30	24	24	
G (APPROX)	17	17	17	17	17	16	17	19	19	13	13	15	16	18	18	16	17	
H	24	24	24	30	42	48	48	48	48	48	48	48	48	48	48	70	77	
J	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	9	13	
K STAND LENGTH	44	44	44	48	52	60	78	78	78	78	78	78	84	84	84	104	118	
L STAND WIDTH	24	24	24	24	24	30	30	30	36	36	44	48	56	56	66	56	66	
M (APPROX)	27	27	27	27	27	23	26	26	29	29	32	35	41	41	44	41	44	
N RECIRC	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	
P CHEMICAL INJECTION	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	
R LOW TEMP RETURNS	1	1	1	1	1 1/2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	3	3	3	4	4	
S HIGH TEMP RETURNS	1	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2 1/2	2 1/2	
T STEAM INLET	3	3	3	3	3	4	4	6	6	6	6	8	8	10	10	10	10	
U VESSEL DRAIN	3/4	3/4	3/4	3/4	3/4	1	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	
V OVERFLOW TRAP	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4	
W VACUUM BREAKER	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	3	3	3	
X SENTINEL RELIEF VALVE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Y VENT	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	
Z WATER INLET CONTROL VALVE	3/4	3/4	3/4	3/4	3/4	3/4	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	2	2	2	2	
AA PRV SENSING	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	
AB PUMP SUCTION	3	3	3	3	3	4	4	4	4	4	6	6	6	6	6	8	8	
AC SAMPLE	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	



DIMENSIONS CLASS "T"
PACKAGED TRAY TYPE DEAERATOR



FRONT VIEW
 UNITS 14MT THRU 125MT



ALTERNATE FRONT VIEW
 UNITS 3.5MT THRU 11MT

MODEL NO.	3.5MT	5MT	7MT	9MT	11MT	14MT	18MT	21MT	24MT	30MT	40MT	50MT	70MT	80MT	90MT	100MT	125MT
CAP-LBS/HR	3,500	5,000	7,000	9,000	11,000	14,000	18,000	21,000	24,000	30,000	40,000	50,000	70,000	80,000	90,000	100,000	125,000
STORAGE CAPACITY (NOTE 2)	MINUTES	21	15	11	10	11	12	12	10	12	10	10	11	10	11	10	10
	GALLONS	150	150	150	182	245	276	418	418	592	592	793	1028	1596	1596	1928	2094
A (APPROX)	63	63	63	75	99	111	113	113	116	116	118	120	125	125	127	169	185
B STORAGE STRAIGHT LENGTH	48	48	48	60	84	96	96	96	96	96	96	96	96	96	96	140	154
C STORAGE DIAMETER	30	30	30	30	30	30	36	36	42	42	48	54	66	66	72	66	72
D DEAERATOR STRAIGHT LENGTH	48	48	48	48	48	48	54	54	54	54	54	54	54	54	54	42	42
E DEAERATOR DIAMETER	18	18	18	18	18	24	30	36	36	36	36	42	48	54	54	54	60
F	19	19	19	18	19	30	30	30	30	30	30	30	30	30	30	24	24
G (APPROX)	17	17	17	17	17	16	17	19	19	13	13	15	16	18	18	16	17
H	24	24	24	30	42	48	48	48	48	48	48	48	48	48	48	70	77
J	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	9	13
K STAND LENGTH	44	44	44	48	52	60	78	78	78	78	78	78	84	84	84	104	118
L STAND WIDTH	24	24	24	24	24	30	30	30	36	36	44	48	56	56	66	56	66
M (APPROX)	27	27	27	27	27	23	26	26	29	29	32	35	41	41	44	41	44
N RECIRC	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2
P CHEMICAL INJECTION	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4
R LOW TEMP RETURNS	1	1	1	1	1 1/2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	2 1/2	3	3	3	4	4
S HIGH TEMP RETURNS	1	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2 1/2	2 1/2
T STEAM INLET	3	3	3	3	3	4	4	6	6	6	6	8	8	10	10	10	10
U VESSEL DRAIN	3/4	3/4	3/4	3/4	3/4	1	1	1	1	1	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2
V OVERFLOW TRAP	1 1/2	1 1/2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	4
W VACUUM BREAKER	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2	2	2	2 1/2	2 1/2	2 1/2	2 1/2	3	3	3
X SENTINEL RELIEF VALVE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Y VENT	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	1 1/2	1 1/2	1 1/2	1 1/2	1 1/2	2	2
Z WATER INLET CONTROL VALVE	3/4	3/4	3/4	3/4	3/4	3/4	1	1	1	1 1/4	1 1/4	1 1/4	1 1/2	2	2	2	2
AA PRV SENSING	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
AB PUMP SUCTION	3	3	3	3	3	4	4	4	4	4	6	6	6	6	6	8	8
AC SAMPLE	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4

- NOTES**
1. DETERMINED BY SPECIFIC PUMP REQUIREMENTS.
 2. STORAGE CAPACITY TO OVERFLOW.
 3. SIZES 3.5MT THRU 11MT WILL HAVE TRAY ACCESS THROUGH COLUMN FLANGE (SEE ALT. FRONT VIEW)
 4. ALL DIMENSIONS IN INCHES.
 5. THIS DRAWING NOT FOR CONSTRUCTION PURPOSES.

bfs INDUSTRIES, LLC
 BUTNER, NORTH CAROLINA

DIMENSIONS CLASS "T"
 PACKAGED TRAY TYPE DEAERATOR

CLASS "T" – TRAY TYPE

MECHANICS OF DEAERATION

Extensive research proves that to inhibit corrosion in a steam system, the oxygen content must be limited to a maximum level of .01ppm (.0075 cc/l). A true deaerator will reduce the oxygen to the .005 cc/l level and the carbon dioxide to zero. A further benefit of this process is the simultaneous pre-heating of the feed water. A tray type deaerator is tailored to fit the power cycle and operating conditions of the actual plant in which it will be installed. The quantity and size of the tray assemblies are determined by these conditions. Therefore, it is important that these maximum loads are not exceeded. Operating beyond these limits can cause flooding and serious damage to the trays and tray enclosure.

The modern deaerator has evolved into a two stage device. The effluent first enters the pre-heater stage where it is heated to a temperature approaching that of the operating steam pressure.

The feed water then enters the second stage, tray section where maximum contact time between steam and water is accomplished while constantly reversing the effluent flow. This forces the remaining oxygen and carbon dioxide to the surface of the liquid where they are liberated from the water.

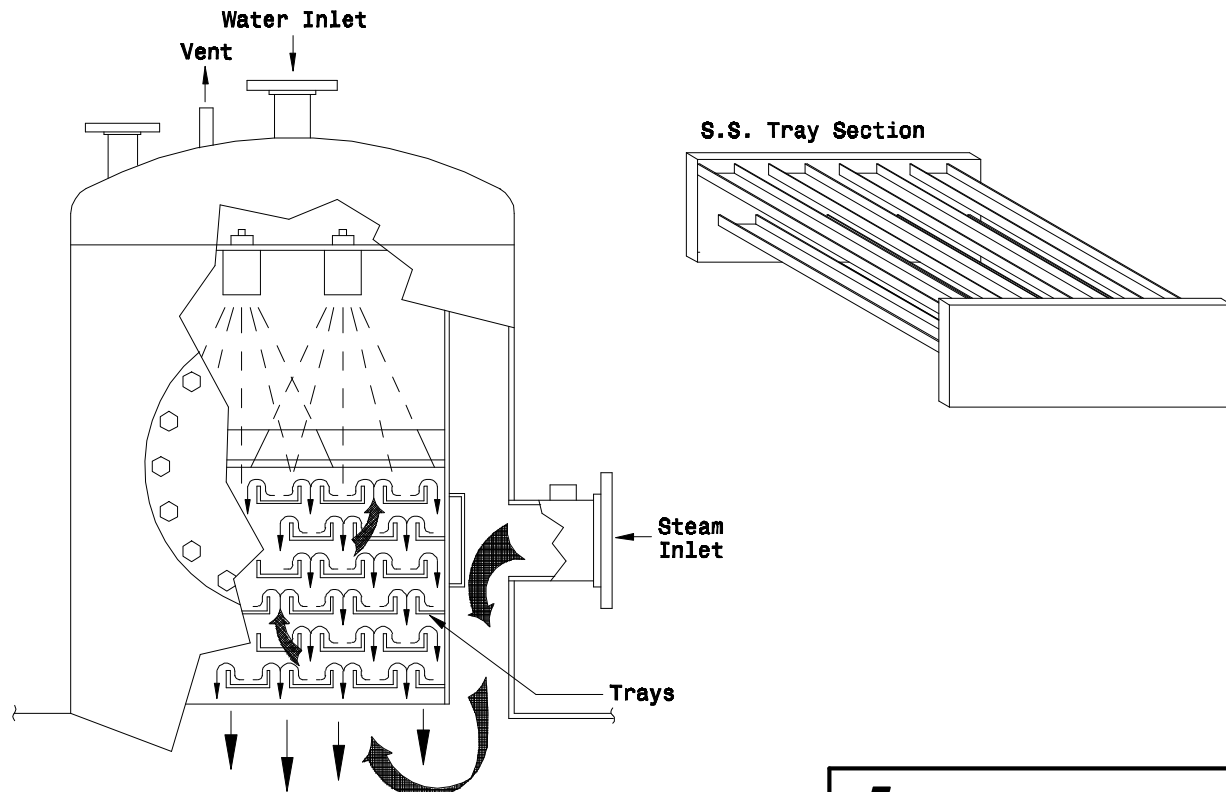
Non-condensable gases must be evacuated from the deaerator at a rate equal to their liberation. A vent condenser is utilized to concentrate the non-condensables and condense the carrier steam, thereby avoiding unnecessary steam venting.

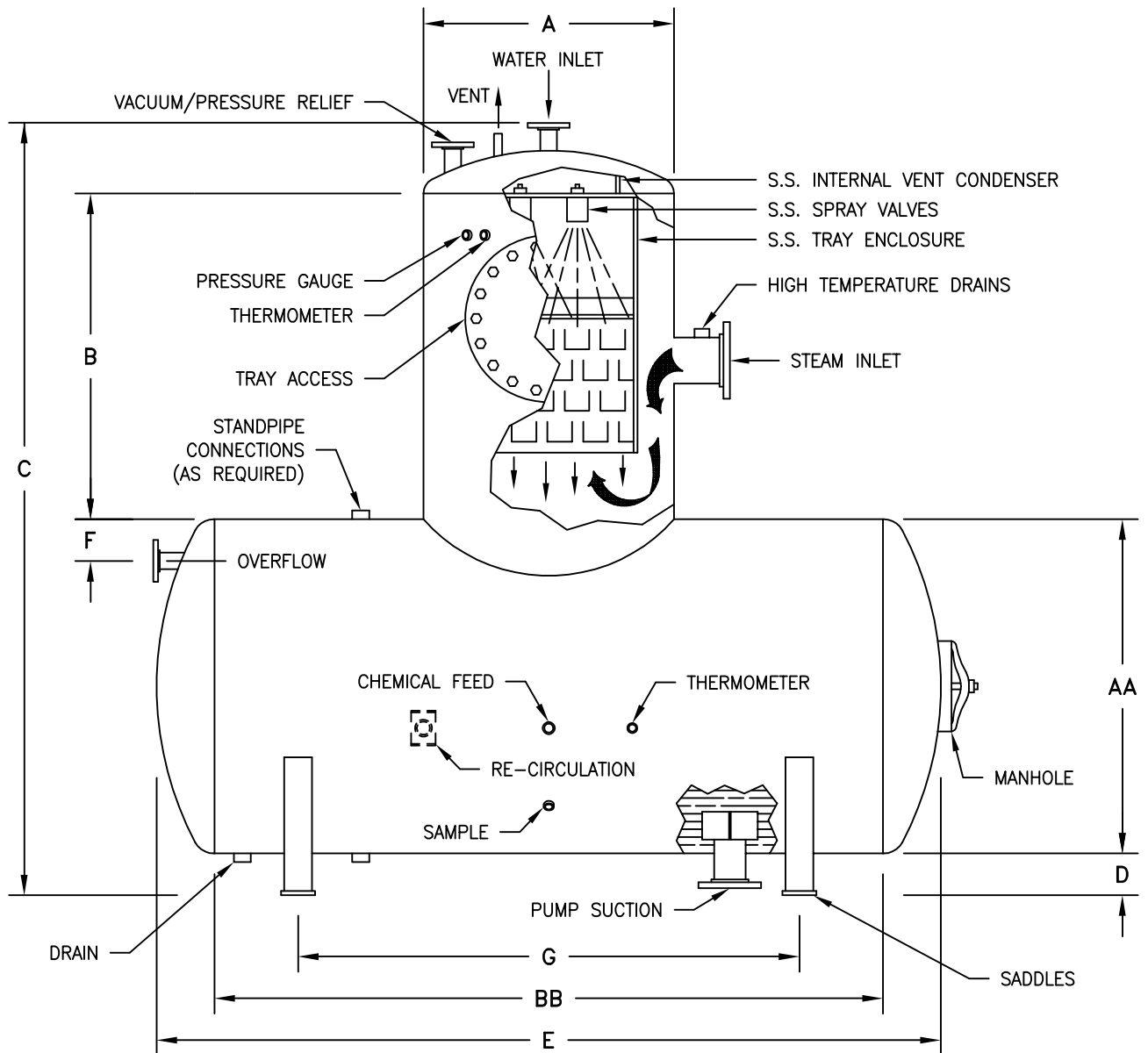
OPERATION

Incoming water first enters the deaerator through the spray valves, directed downward into the steam atmosphere in the first stage pre-heater section. There the water is heated to within two degrees of the steam temperature in the deaerator. This is accomplished by spraying water through self-adjusting spray valves designed to produce a uniform, thin, continuous film thru all load conditions. These efficient valves assure a constant temperature and uniform gas removal.

From the first stage the pre-heated water, containing traces of dissolved gasses flows into the second stage or tray section. This section consists of stainless steel tray assemblies where the water flows from tray layer to tray later while being brought into direct contact with an abundance of fresh, gas-free steam. The steam enters this stage at the base of the tray stack and is mixed with the pre-heated water as it rises up diametrically opposed to the falling water. The rate of deaeration is proportionate to the number of directional reversals occurring as the water makes its way through the tray stack. Each change in direction exposes another surface of water to the passing steam where direct physical contact shakes loose the dissolved gasses, separating them from the effluent. Very little steam is condensed here, as incoming pre-heated water has a temperature approaching that of the steam. The water leaving this stage, now completely deaerated and heated to the steam temperature corresponding to the pressure within the deaerator falls into the storage section where it remains ready for use.

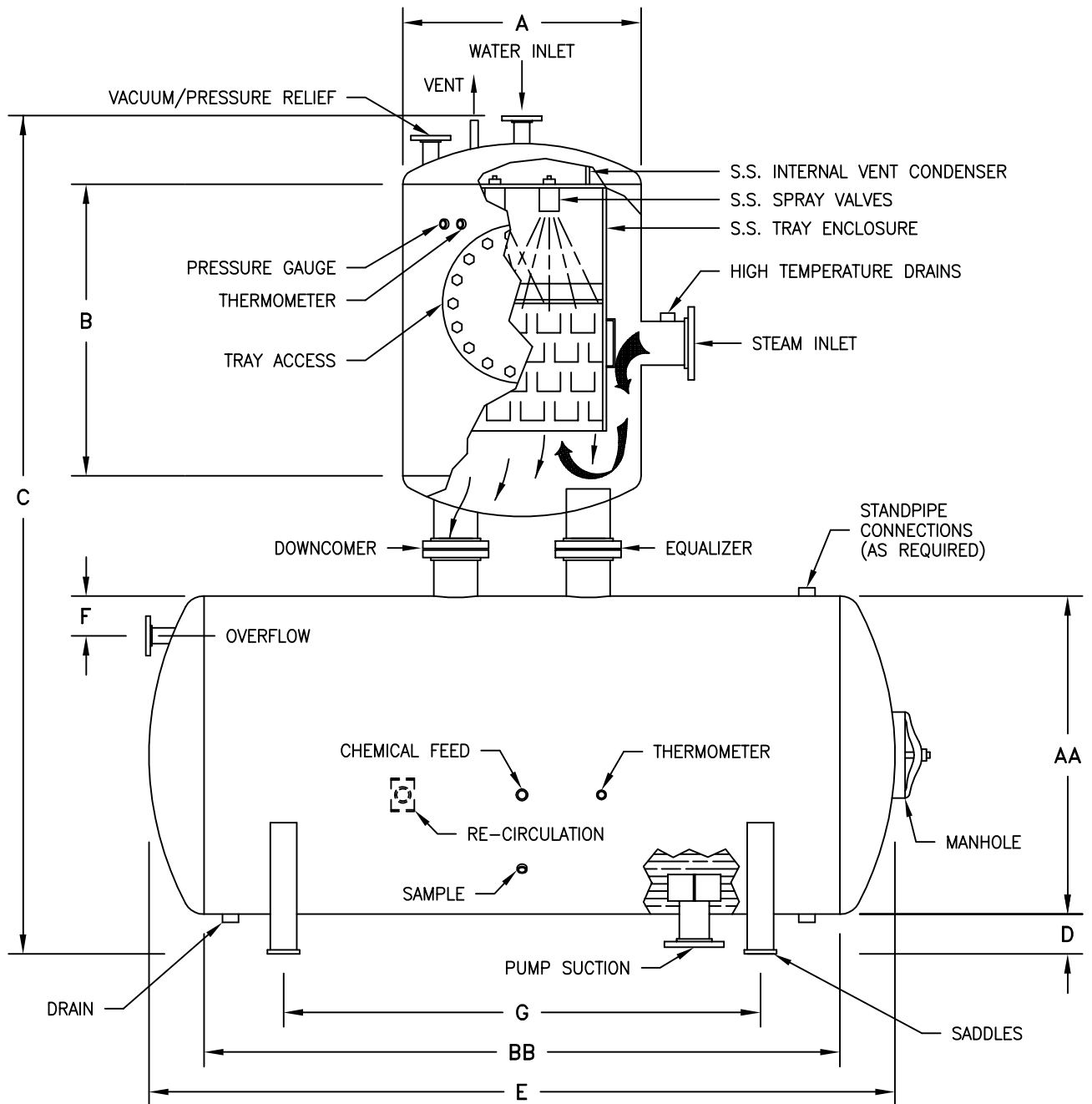
The steam, after passing through the tray stack, continues upward into the vent condenser where most of it is condensed leaving the non-condensable gases to escape through the vent to atmosphere.





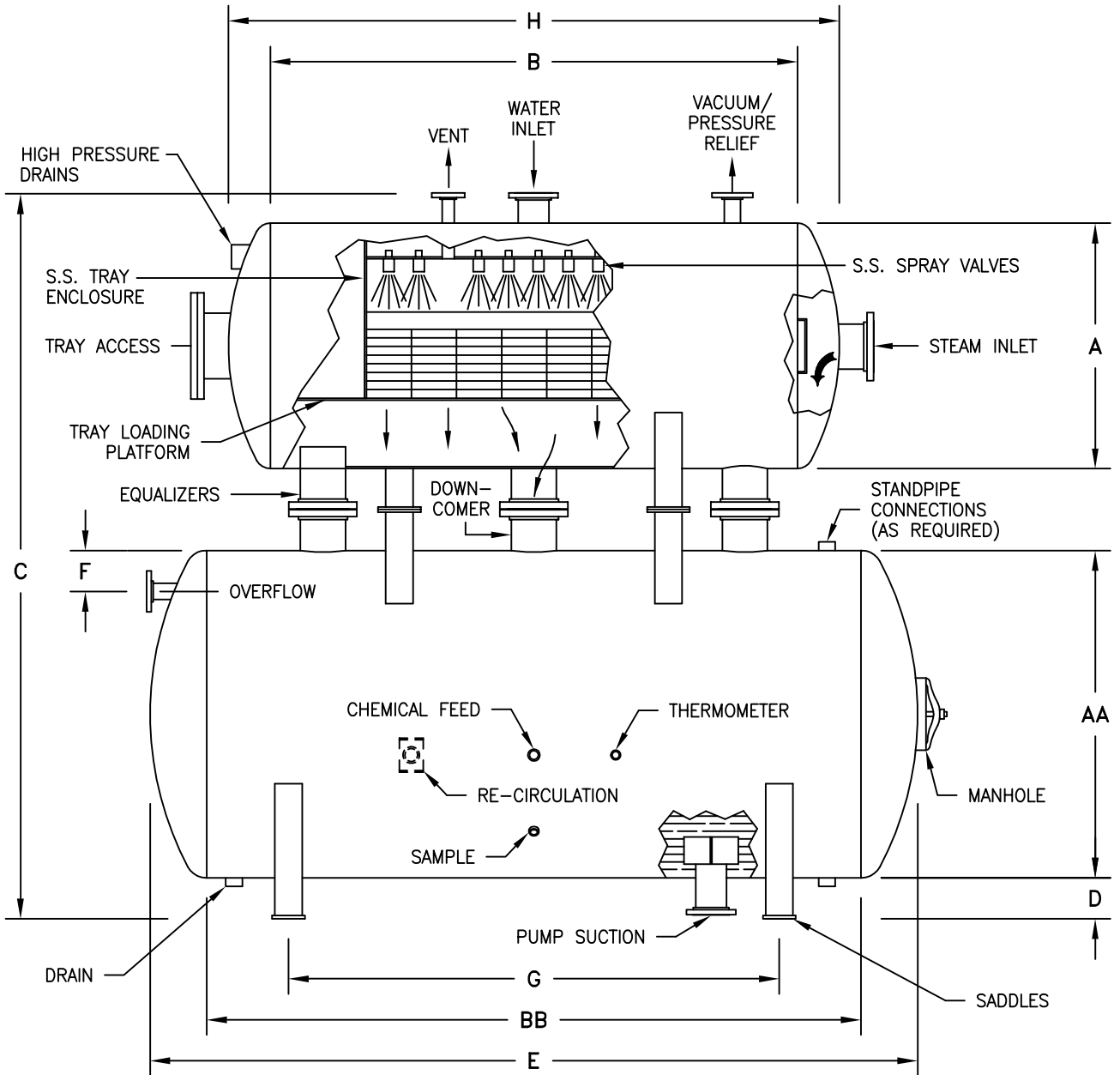
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 BUTNER, NORTH CAROLINA

DIMENSIONS CLASS "TC"
 TRAY TYPE DEAERATOR



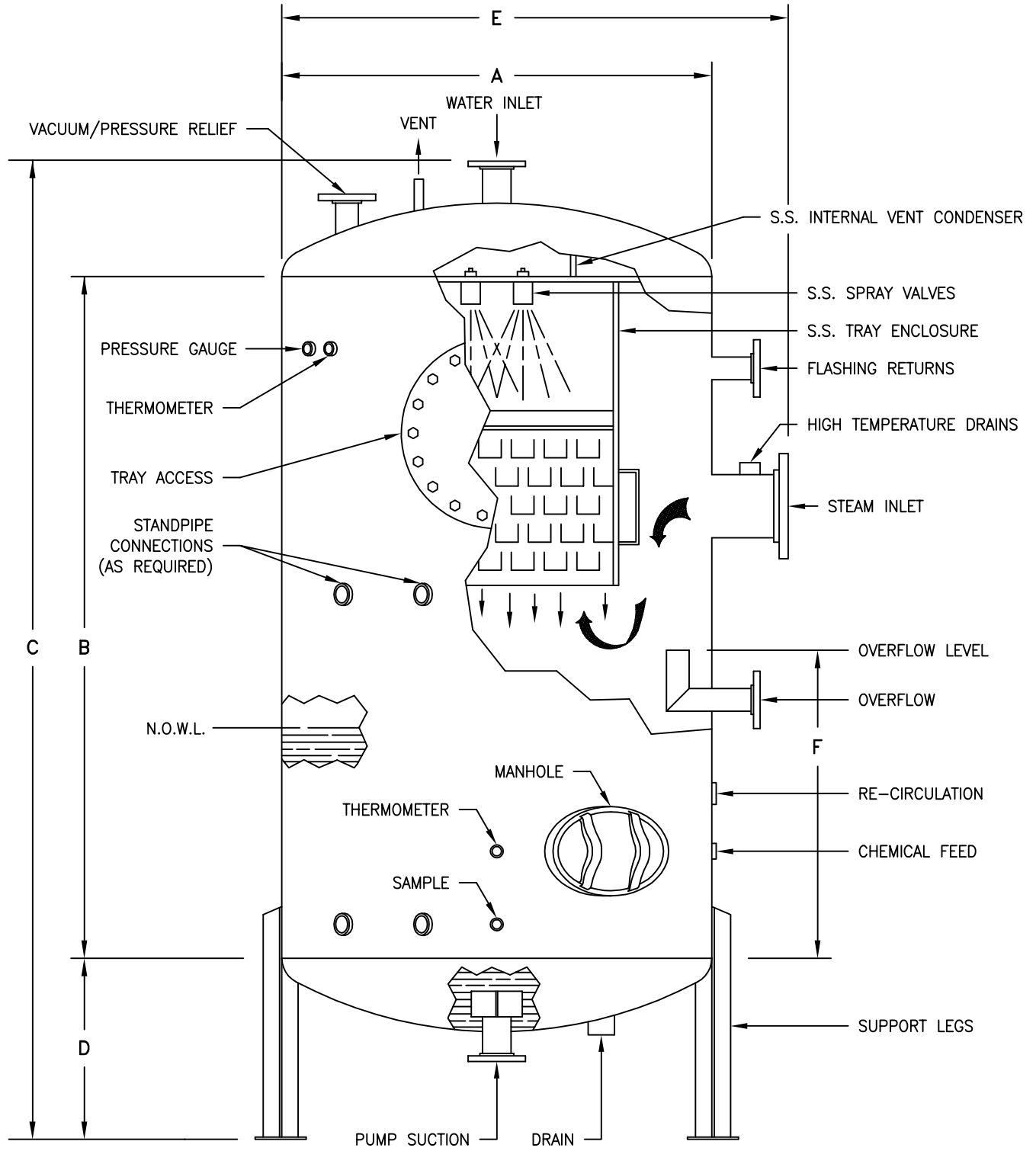
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 BUTNER, NORTH CAROLINA

DIMENSIONS CLASS "DVT"
 TRAY TYPE DEAERATOR



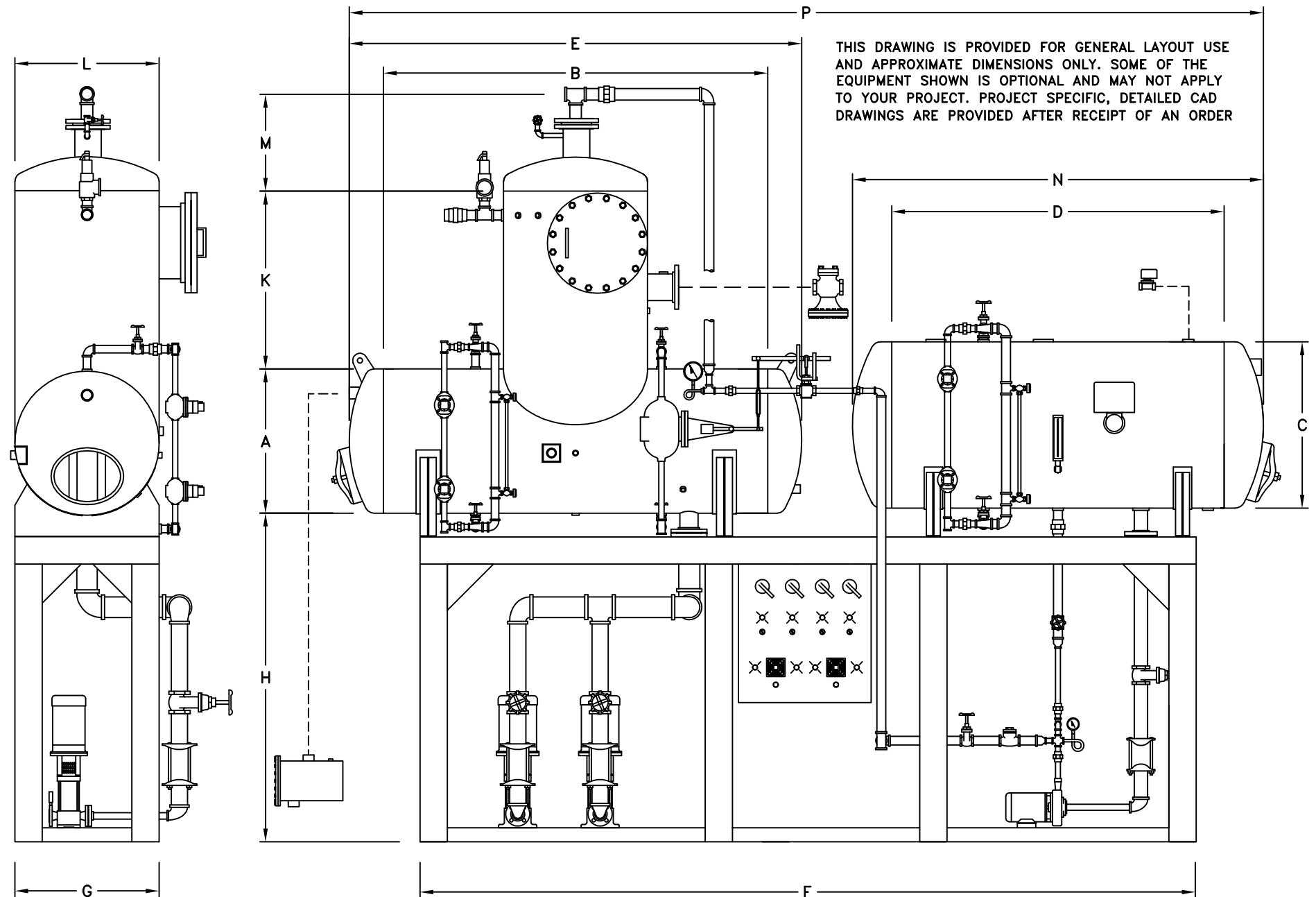
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DIMENSIONS CLASS "DHT"
 TRAY TYPE DEAERATOR



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DIMENSIONS CLASS "VT"
TRAY TYPE DEAERATOR



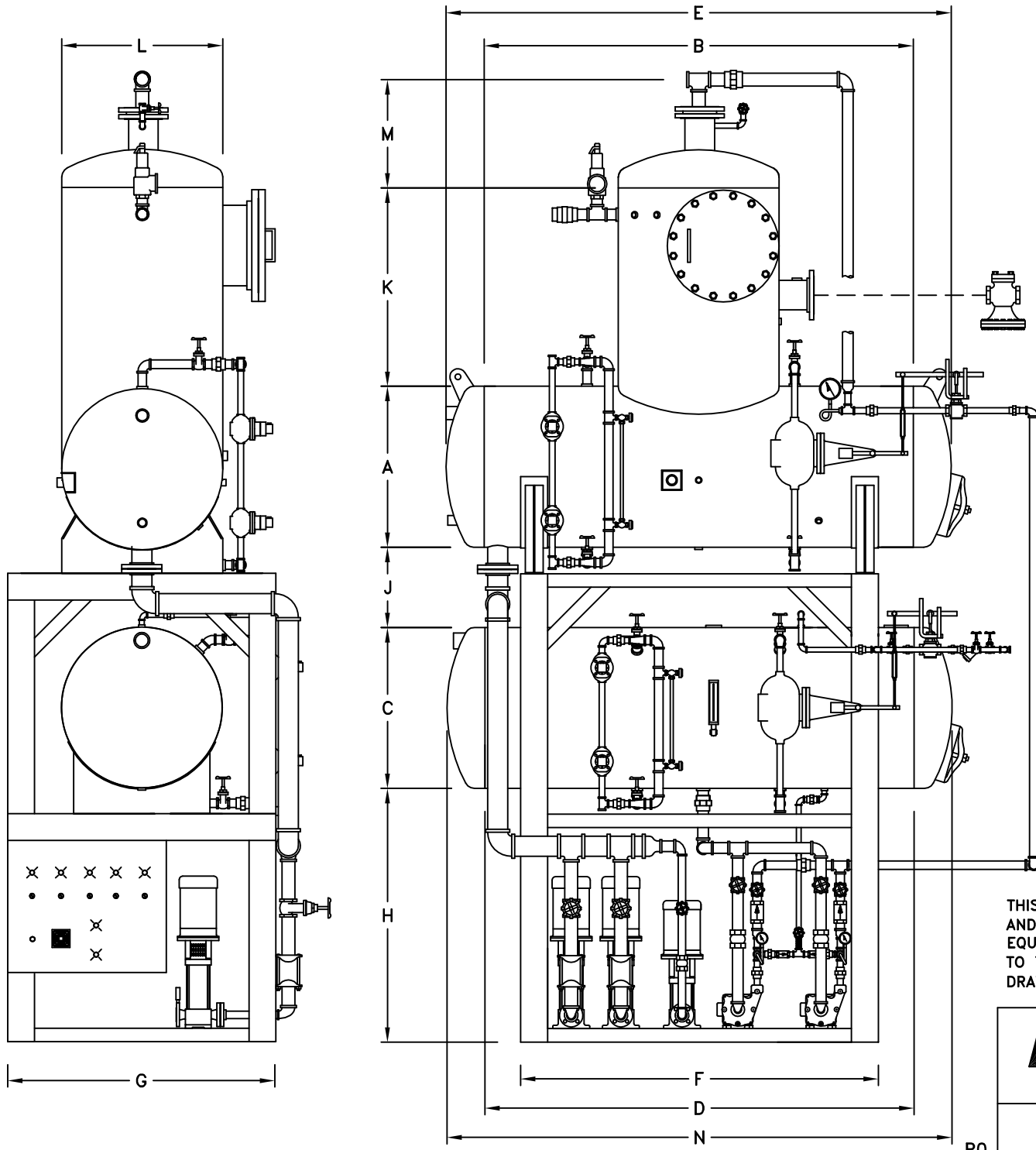
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- | | | | | |
|----------|----------|----------|----------|----------|
| A: _____ | D: _____ | G: _____ | L: _____ | P: _____ |
| B: _____ | E: _____ | H: _____ | M: _____ | |
| C: _____ | F: _____ | K: _____ | N: _____ | |

BFS INDUSTRIES, LLC
 BUTNER, NORTH CAROLINA

PACKAGED TRAY TYPE END TO END
 DEAERATOR AND SURGE

RO



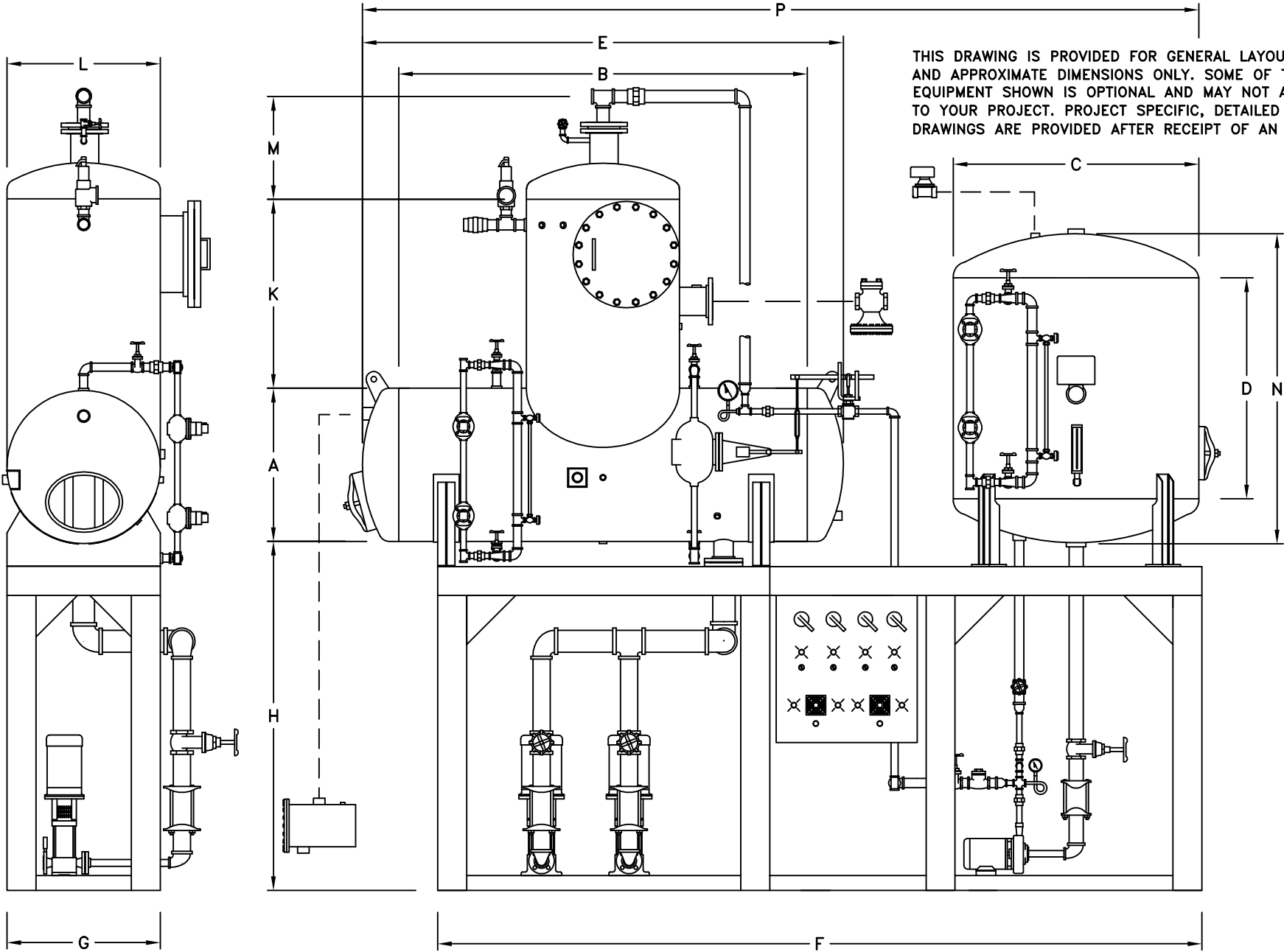
- A: _____
- B: _____
- C: _____
- D: _____
- E: _____
- F: _____
- G: _____
- H: _____
- J: _____
- K: _____
- L: _____
- M: _____
- N: _____

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PACKAGED TRAY TYPE OVER/UNDER
 DEAERATOR AND SURGE

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A: _____ D: _____ G: _____ L: _____ P: _____
 B: _____ E: _____ H: _____ M: _____
 C: _____ F: _____ K: _____ N: _____

BFS INDUSTRIES, LLC
 BUTNER, NORTH CAROLINA

PACKAGED TRAY TYPE END BY SIDE
 DEAERATOR AND VERTICAL SURGE

RO