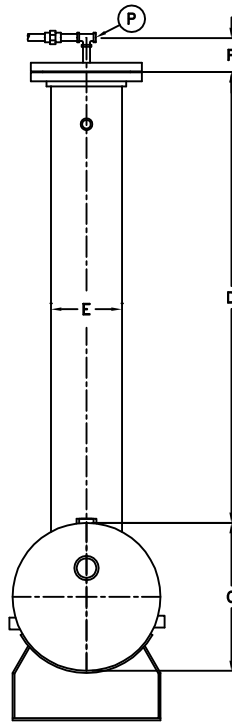


FRONT VIEW  
UNITS 1.5MP THRU 11MP

SIDE VIEW

NOTES

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

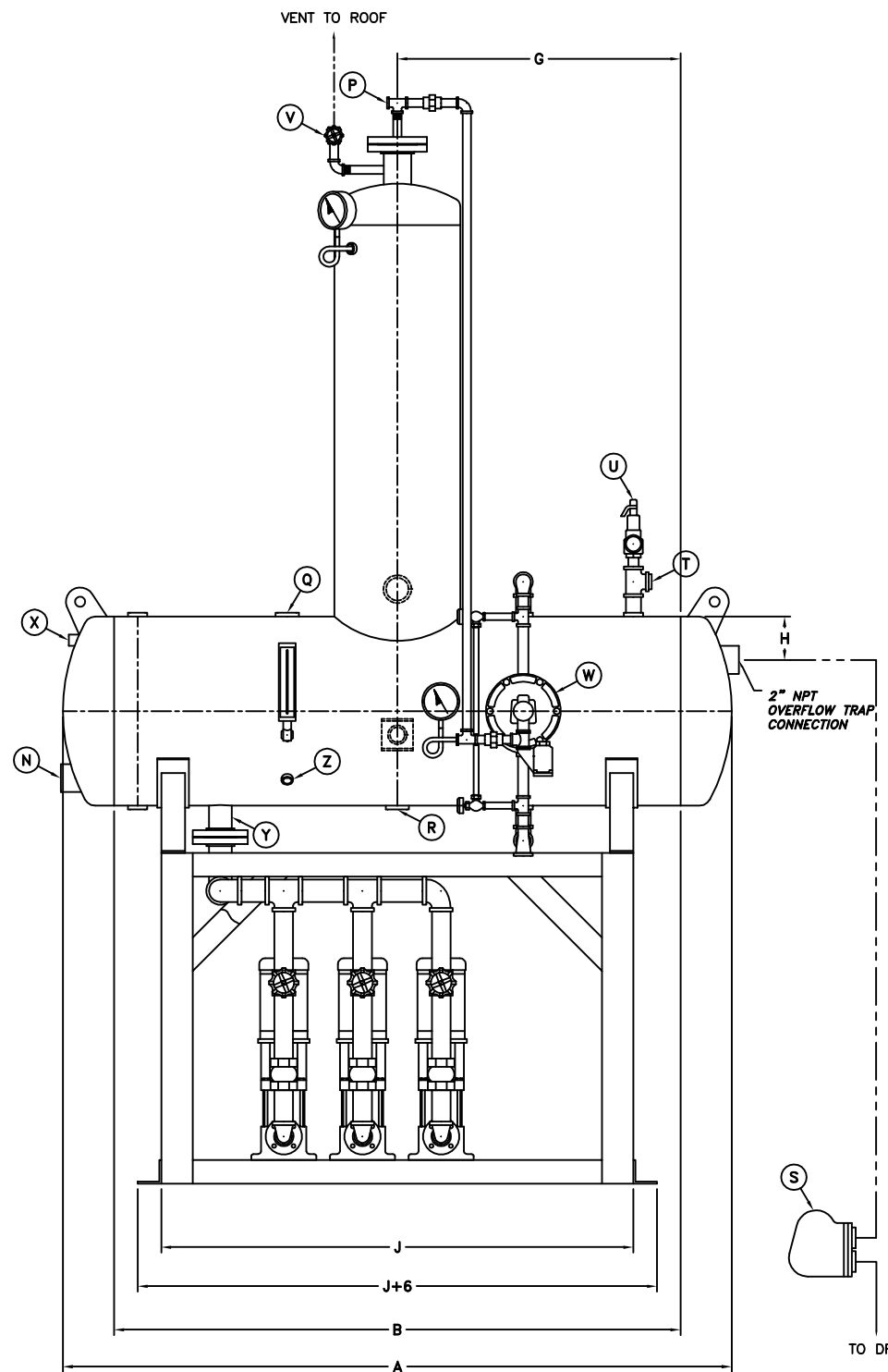


ALTERNATE SIDE VIEW  
 UNITS .2MP THRU 1MP

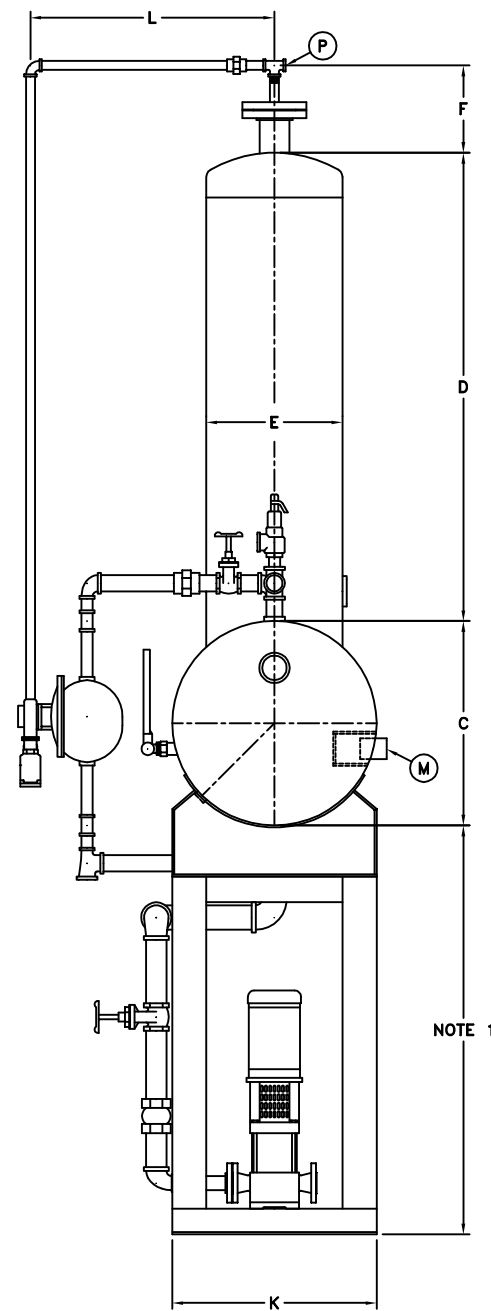
MODEL NO.	.2MP	.5MP	1MP	1.5MP	2.5MP	3.5MP	5MP	7MP	9MP	11MP
CAP-LBS/HR	200	500	1,000	1,500	2,500	3,500	5,000	7,000	9,000	11,000
STORAGE CAPACITY (NOTE 2)	MINUTES	30	12	15	10	10	12	12	11	10
	GALLONS	12	12	31	31	50	88	126	150	182
A (APPROX)	56	56	58	58	70	60	88	62	74	98
B STORAGE STRAIGHT LENGTH	48	48	48	48	60	48	72	48	60	84
C STORAGE DIAMETER	12	12	18	18	18	24	24	30	30	30
D DEAERATOR STRAIGHT LENGTH	55	55	55	55	55	55	55	55	55	55
E DEAERATOR DIAMETER	4	6	8	10	12	14	16	20	20	24
F (APPROX)	4	4	4	12	12	12	12	12	12	12
G	24	24	24	24	30	24	36	24	30	42
H	4	4	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5	5	5
J STAND LENGTH	42	42	42	42	48	42	60	42	48	60
K STAND WIDTH	18	18	18	24	24	24	24	30	30	30
L (APPROX)	18	18	20	20	20	22	22	25	25	25
M RECIRC	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
N CHEMICAL INJECTION	2	2	2	2	2	2	2	3	3	3
P LOW TEMP RETURNS	1/2	1/2	1/2	1/2	1/2	3/4	3/4	1 1/2	1 1/2	1 1/2
Q STEAM INLET	1	1	1	1	1	2	2	3	3	3
R VESSEL DRAIN	2	2	2	2	2	2	2	2	2	2
S OVERFLOW TRAP	3/4	3/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	2	2	2
T VACUUM BREAKER	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
U SENTINEL RELIEF VALVE	1	1	1	1	1	1	1	1	1	1
V VENT	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
W WATER INLET CONTROL VALVE	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
X PRV SENSING	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Y PUMP SUCTION	1 1/2	1 1/2	2	2	2	2 1/2	2 1/2	3	3	3
Z SAMPLE	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4

**BFS INDUSTRIES, LLC**  
 BUTNER, NORTH CAROLINA

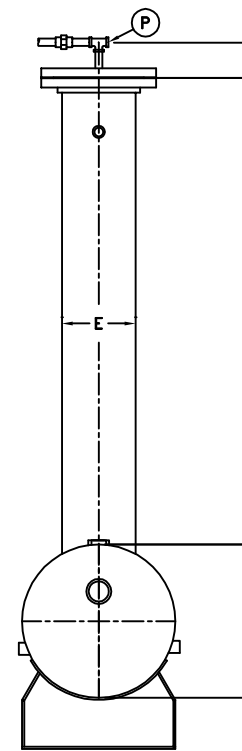
DIMENSIONS CLASS "P"  
 PACKAGED PACKED COLUMN DEAERATOR



FRONT VIEW  
 UNITS 1.5MP THRU 11MP



SIDE VIEW



ALTERNATE SIDE VIEW  
 UNITS .2MP THRU 1MP

NOTES

1. DETERMINED BY SPECIFIC PUMP REQUIREMENTS.
2. STORAGE CAPACITY TO OVERFLOW.
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MODEL NO.	.2MP	.5MP	1MP	1.5MP	2.5MP	3.5MP	5MP	7MP	9MP	11MP
CAP-LBS/HR	200	500	1,000	1,500	2,500	3,500	5,000	7,000	9,000	11,000
STORAGE CAPACITY (NOTE 2)	MINUTES	30	12	15	10	10	12	12	11	10
	GALLONS	12	12	31	31	50	88	126	150	182
A (APPROX)	56	56	58	58	70	60	88	62	74	98
B STORAGE STRAIGHT LENGTH	48	48	48	48	60	48	72	48	60	84
C STORAGE DIAMETER	12	12	18	18	18	24	24	30	30	30
D DEAERATOR STRAIGHT LENGTH	55	55	55	55	55	55	55	55	55	55
E DEAERATOR DIAMETER	4	6	8	10	12	14	16	20	20	24
F (APPROX)	4	4	4	12	12	12	12	12	12	12
G	24	24	24	24	30	24	36	24	30	42
H	4	4	5 1/2	5 1/2	5 1/2	5 1/2	5 1/2	5	5	5
J STAND LENGTH	42	42	42	42	48	42	60	42	48	60
K STAND WIDTH	18	18	18	24	24	24	24	30	30	30
L (APPROX)	18	18	20	20	20	22	22	25	25	25
M RECIRC	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
N CHEMICAL INJECTION	2	2	2	2	2	2	2	3	3	3
P LOW TEMP RETURNS	1/2	1/2	1/2	1/2	1/2	3/4	3/4	1 1/2	1 1/2	1 1/2
Q STEAM INLET	1	1	1	1	1	2	2	3	3	3
R VESSEL DRAIN	2	2	2	2	2	2	2	2	2	2
S OVERFLOW TRAP	3/4	3/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	2	2	2
T VACUUM BREAKER	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
U SENTINEL RELIEF VALVE	1	1	1	1	1	1	1	1	1	1
V VENT	1/2	1/2	1/2	1/2	1/2	3/4	3/4	3/4	3/4	3/4
W WATER INLET CONTROL VALVE	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
X PRV SENSING	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4
Y PUMP SUCTION	1 1/2	1 1/2	2	2	2	2 1/2	2 1/2	3	3	3
Z SAMPLE	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4	3/4



DIMENSIONS CLASS "P"  
 PACKAGED PACKED COLUMN DEAERATOR

## CLASS "P" – PACKED COLUMN TYPE

### MECHANICS OF DEAERATION

Studies indicate that to inhibit corrosion in a steam system, the oxygen content must be limited to a maximum level of .01 ppm. (.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 packed column deaerator is tailored to fit the power cycle and operating conditions of the actual plant in which it will be installed. It is important that these maximum loads are not exceeded.

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, packed column where the liquid changes direction constantly as it flows down thru the packing shaking out the remaining traces of gas. This action assures the maximum contact time between the steam and water and forces the remaining traces of oxygen and carbon dioxide to the surface of the liquid where they are liberated from the water.

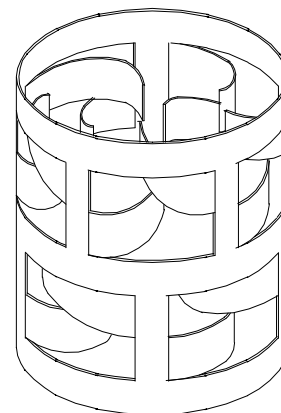
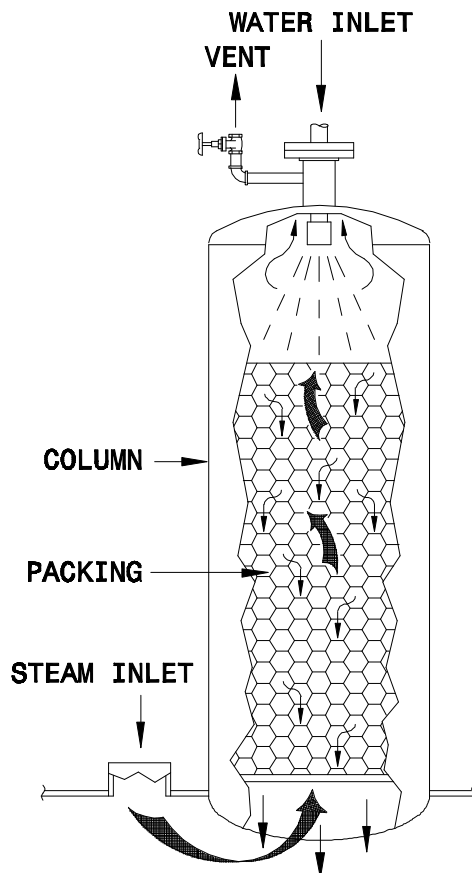
Non-condensable gasses must be evacuated from the deaerator at a rate equal to their liberation. A vent condenser is utilized to concentrate the non-condensables gasses and condense the carrier steam, thereby avoiding unnecessary steam venting.

### OPERATION

Incoming water first enters the deaerator through the spray valves directed downward into a 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 the incoming 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.

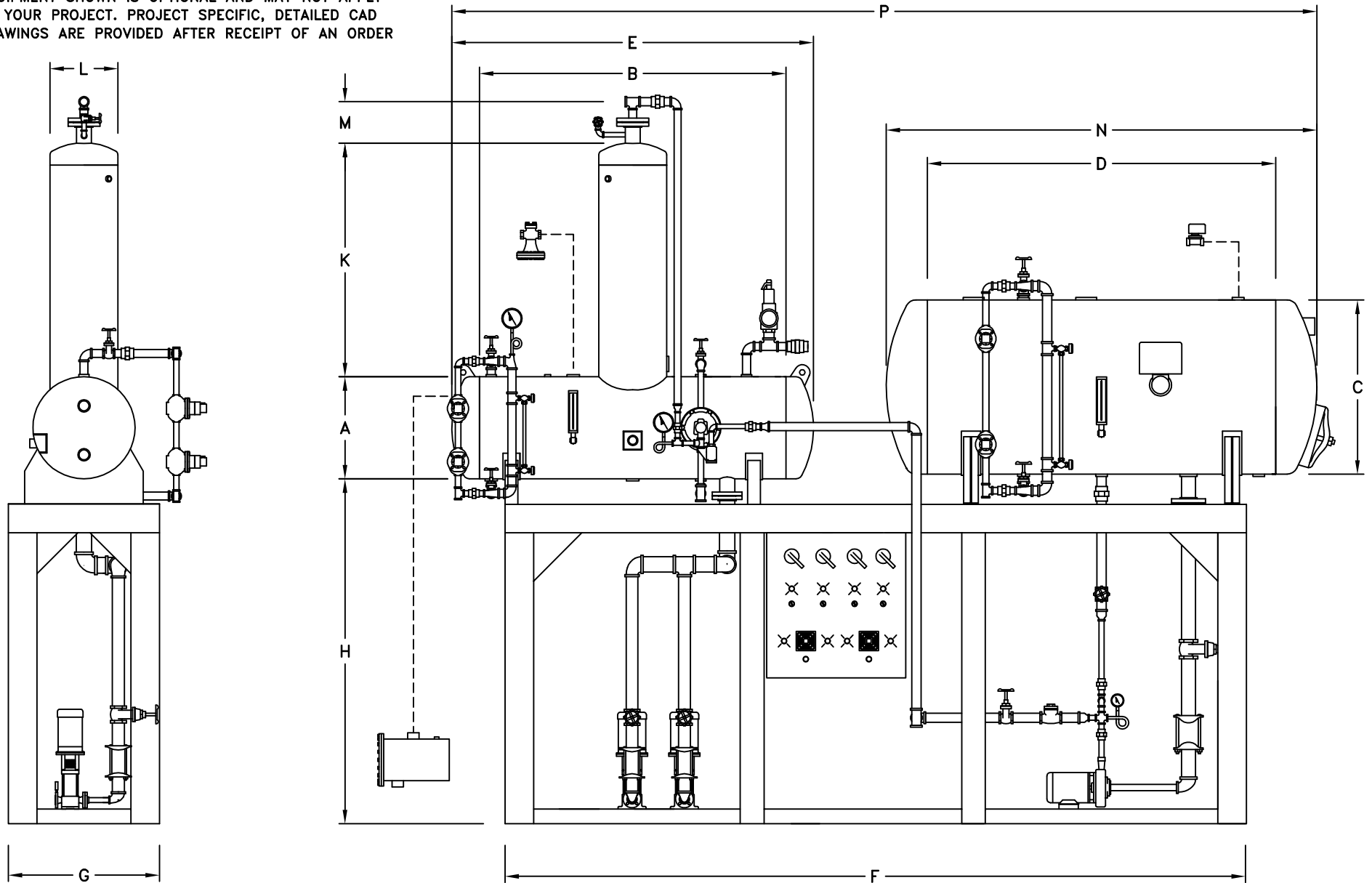
From the first stage the pre-heated water containing traces of dissolved gasses flows into the second stage or packed column. This section consists of high efficiency stainless steel packing to a predetermined, optimum level. The effluent flows downward, finding its way through the packing while being brought into direct contact with an abundance of fresh, gas-free steam. The steam enters this stage at the base of the column and is mixed with the pre-heated water as it rises up diametrically opposed to the falling water. Here direct physical contact adds to the liberation of the dissolved gasses 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 vessel falls into the storage section where it remains ready for use.

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



**HIGH EFFICIENCY  
S.S. PACKING**

THIS DRAWING IS PROVIDED FOR GENERAL LAYOUT USE AND APPROXIMATE DIMENSIONS ONLY. SOME OF THE EQUIPMENT SHOWN IS OPTIONAL AND MAY NOT APPLY TO YOUR PROJECT. PROJECT SPECIFIC, DETAILED CAD DRAWINGS ARE PROVIDED AFTER RECEIPT OF AN ORDER



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

**BFS INDUSTRIES, LLC**  
 BUTNER, NORTH CAROLINA

PACKAGED PACKED COLUMN END TO END  
 DEAERATOR AND SURGE

R0