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=          VENTURI FLOW METER CALCULATION          =
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PROGRAM NAME : DESIGN PROGRAM OF AIR FLOW METER
PROGRAM VERSION      : <VENTRUI 2017>
PROGRAM DEVISON NO.  : <02>
PROGRAM ANNOUNCEMENT DATE : APRIL 01, 2001.
SINCE 1980

Heat Aid Design(had1999@naver.com)

< Let us know if there are any questions. >
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PROJECT New_Project
DATE OF RUNNING 2019/ 2/20
@ 2001 HEAT AID DESIGN
DESIGNED BY HAD_Marker

VENTURI CALCULATION
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DESIGN CONDITION

MCR Flow Rate : 45358.00 Nm3/h
Venturi Inlet Press : 595.00 mmAq
Ambient Air Temp : 25.00 deg C
Relative Humidity : 65.40 %
Density (Normal) : 1.2826 kg/Nm3
Venturi Inlet Temp : 25.00 deg C
Density (Actual) : 1.2427 kg/m3

Venturi Throat Press : 300.00 mmAq

VENTURI DIMENSION

Venturi Width : 1200.00 mm
Venturi Inlet Height : 860.00 mm
Throat Height : 165.00 mm
Outlet Height : 860.00 mm
Angle Contraction : 40.00 Deg
Diffusing : 20.00 Deg
Length Contraction : 954.75 mm
Throat : 150.00 mm
Diffusing : 1970.77 mm
T o t a l : 3075.52 mm
Upstream Nozzle Location : 1146.29 mm

Up-Stream Pressure : 595.00 mm Aq
Throat Pressure : 300.00 mm Aq
Outlet Pressure : 516.86 mm Aq
Up-Stream Velocity : 12.60 m/s
Throat Velocity : 65.68 m/s
Outlet Velocity : 12.60 m/s
Velocity Head Inlet : 10.06 mm Aq
Throat : 279.69 mm Aq
Head Loss Inlet : 0.19 mm Aq
Contraction : 4.69 mm Aq
Throat 1 : 0.98 mm Aq
Throat 2 : 0.98 mm Aq
Diffusing : 71.31 mm Aq
T o t a l : 78.14 mm Aq

LOAD = Boiler Load %

output

FLOW = Air Flowrate m3/hr
 V1 = Up-Stream Velocity m/sec
 V2 = Throat Velocity m/sec
 DELP = Throat Pressure Drop mmAq
 HLC = Contraction Press. D mmAq
 HLD = Difusing Press. D mmAq
 HLT = Total Press. D mmAq

DEL P FOR DIFFERENT LOAD (AT DESIGN CONDITION)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4535.8	1.26	6.57	2.80	0.06	0.71	0.76
20.	9071.6	2.52	13.14	11.22	0.23	2.83	3.06
30.	13607.4	3.78	19.70	25.30	0.53	6.36	6.89
40.	18143.2	5.04	26.27	45.11	0.93	11.32	12.26
50.	22679.0	6.30	32.84	70.79	1.46	17.72	19.18
60.	27214.8	7.56	39.41	102.46	2.10	25.57	27.67
70.	31750.6	8.82	45.97	140.32	2.86	34.89	37.75
80.	36286.4	10.08	52.54	184.62	3.74	45.70	49.44
90.	40822.2	11.34	59.11	235.63	4.73	58.03	62.77
100.	45358.0	12.60	65.68	293.72	5.85	71.92	77.77
110.	49893.8	13.86	72.24	359.31	7.08	87.40	94.48
120.	54429.6	15.12	78.81	432.92	8.43	104.52	112.95
130.	58965.4	16.38	85.38	515.21	9.91	123.34	133.25
140.	60000.0	16.67	86.88	535.27	10.26	127.88	138.14

DEL P FOR DIFFERENT LOAD (AT 0.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4460.7	1.20	6.26	2.64	0.06	0.67	0.72
20.	8921.4	2.40	12.49	10.56	0.22	2.66	2.88
30.	13382.1	3.59	18.70	23.75	0.49	5.97	6.47
40.	17842.8	4.77	24.84	42.21	0.87	10.59	11.47
50.	22303.5	5.93	30.90	65.90	1.36	16.50	17.86
60.	26764.2	7.07	36.87	94.80	1.95	23.67	25.61
70.	31224.9	8.19	42.70	128.84	2.63	32.06	34.69
80.	35685.6	9.29	48.40	167.95	3.41	41.63	45.03
90.	40146.3	10.35	53.93	212.04	4.27	52.33	56.60
100.	44607.0	11.37	59.29	260.99	5.22	64.11	69.33
110.	49067.7	12.36	64.44	314.67	6.25	76.91	83.16
120.	53528.4	13.31	69.39	372.91	7.34	90.66	98.00
130.	57989.1	14.22	74.12	435.51	8.50	105.29	113.79
140.	60000.0	14.61	76.17	465.10	9.04	112.15	121.19

DEL P FOR DIFFERENT LOAD (AT 5.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4468.3	1.22	6.38	2.70	0.06	0.68	0.74
20.	8936.5	2.45	12.74	10.78	0.23	2.72	2.94
30.	13404.8	3.66	19.07	24.26	0.50	6.10	6.60
40.	17873.0	4.86	25.34	43.11	0.89	10.82	11.71
50.	22341.3	6.05	31.52	67.31	1.39	16.85	18.24
60.	26809.5	7.21	37.60	96.82	1.99	24.17	26.15
70.	31277.8	8.36	43.56	131.60	2.69	32.74	35.42
80.	35746.0	9.47	49.36	171.57	3.48	42.51	45.99
90.	40214.3	10.55	55.00	216.64	4.36	53.44	57.81
100.	44682.6	11.60	60.46	266.70	5.33	65.48	70.81
110.	49150.8	12.61	65.72	321.60	6.38	78.55	84.93
120.	53619.1	13.58	70.76	381.18	7.50	92.60	100.09
130.	58087.3	14.50	75.58	445.25	8.68	107.54	116.22
140.	60000.0	14.88	77.56	473.99	9.20	114.19	123.40

DEL P FOR DIFFERENT LOAD (AT 10.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4478.6	1.25	6.51	2.75	0.06	0.69	0.75
20.	8957.2	2.49	13.00	11.02	0.23	2.77	3.00
30.	13435.7	3.73	19.46	24.79	0.51	6.23	6.75
40.	17914.3	4.96	25.85	44.05	0.91	11.05	11.97
50.	22392.9	6.17	32.16	68.79	1.42	17.22	18.64
60.	26871.5	7.36	38.36	98.96	2.03	24.70	26.73

output

70.	31350.1	8.53	44.44	134.52	2.74	33.45	36.20
80.	35828.6	9.66	50.36	175.40	3.55	43.44	47.00
90.	40307.2	10.77	56.11	221.50	4.46	54.61	59.07
100.	44785.8	11.83	61.68	272.71	5.45	66.91	72.36
110.	49264.4	12.86	67.03	328.89	6.52	80.28	86.79
120.	53743.0	13.85	72.17	389.89	7.66	94.63	102.29
130.	58221.5	14.79	77.08	455.49	8.86	109.91	118.77
140.	60000.0	15.15	78.96	482.77	9.36	116.21	125.57

DEL P FOR DIFFERENT LOAD (AT 15.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4492.5	1.28	6.65	2.82	0.06	0.71	0.77
20.	8985.0	2.55	13.27	11.27	0.24	2.84	3.07
30.	13477.6	3.81	19.86	25.35	0.53	6.37	6.90
40.	17970.1	5.06	26.39	45.06	0.93	11.31	12.24
50.	22462.6	6.30	32.83	70.37	1.45	17.61	19.06
60.	26955.1	7.51	39.16	101.25	2.08	25.26	27.34
70.	31447.6	8.70	45.35	137.64	2.81	34.22	37.02
80.	35940.2	9.86	51.40	179.48	3.64	44.43	48.07
90.	40432.7	10.99	57.26	226.68	4.56	55.86	60.42
100.	44925.2	12.08	62.94	279.12	5.57	68.44	74.01
110.	49417.7	13.12	68.40	336.68	6.66	82.11	88.77
120.	53910.2	14.13	73.64	399.17	7.83	96.80	104.63
130.	58402.8	15.09	78.64	466.41	9.06	112.42	121.49
140.	60000.0	15.42	80.35	491.41	9.52	118.19	127.71

DEL P FOR DIFFERENT LOAD (AT 20.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4511.1	1.30	6.79	2.89	0.06	0.73	0.79
20.	9022.3	2.60	13.56	11.54	0.24	2.91	3.15
30.	13533.4	3.89	20.29	25.97	0.54	6.53	7.07
40.	18044.6	5.17	26.95	46.16	0.96	11.58	12.54
50.	22555.7	6.43	33.53	72.09	1.49	18.04	19.52
60.	27066.9	7.67	39.99	103.72	2.13	25.87	28.00
70.	31578.0	8.89	46.32	141.02	2.87	35.04	37.92
80.	36089.2	10.07	52.49	183.90	3.72	45.51	49.23
90.	40600.3	11.22	58.48	232.29	4.67	57.21	61.88
100.	45111.5	12.33	64.26	286.07	5.70	70.10	75.80
110.	49622.6	13.40	69.84	345.10	6.82	84.10	90.92
120.	54133.8	14.42	75.17	409.21	8.01	99.14	107.15
130.	58644.9	15.40	80.27	478.20	9.28	115.14	124.41
140.	60000.0	15.68	81.75	499.85	9.67	120.12	129.79

DEL P FOR DIFFERENT LOAD (AT 25.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4535.8	1.33	6.94	2.96	0.06	0.75	0.81
20.	9071.6	2.66	13.87	11.84	0.25	2.98	3.23
30.	13607.4	3.98	20.75	26.65	0.55	6.70	7.25
40.	18143.2	5.29	27.56	47.37	0.98	11.88	12.86
50.	22679.0	6.58	34.28	73.98	1.52	18.51	20.03
60.	27214.8	7.85	40.89	106.46	2.18	26.55	28.73
70.	31750.6	9.09	47.35	144.75	2.95	35.96	38.90
80.	36286.4	10.29	53.65	188.78	3.82	46.69	50.51
90.	40822.2	11.47	59.77	238.48	4.79	58.70	63.49
100.	45358.0	12.60	65.68	293.72	5.85	71.92	77.77
110.	49893.8	13.69	71.36	354.36	6.99	86.28	93.27
120.	54429.6	14.74	76.80	420.24	8.22	101.70	109.92
130.	58965.4	15.73	81.99	491.15	9.51	118.11	127.62
140.	60000.0	15.95	83.14	508.01	9.81	121.98	131.80

DEL P FOR DIFFERENT LOAD (AT 30.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4568.2	1.36	7.11	3.05	0.06	0.77	0.83
20.	9136.3	2.72	14.20	12.18	0.25	3.07	3.32
30.	13704.5	4.08	21.24	27.41	0.57	6.89	7.46
40.	18272.7	5.41	28.22	48.73	1.01	12.22	13.23
50.	22840.9	6.73	35.10	76.11	1.57	19.04	20.60
60.	27409.0	8.03	41.86	109.53	2.24	27.30	29.55

output

70.	31977.2	9.30	48.47	148.93	3.03	36.98	40.01
80.	36545.4	10.54	54.91	194.26	3.93	48.02	51.95
90.	41113.6	11.73	61.16	245.41	4.92	60.37	65.29
100.	45681.7	12.89	67.20	302.28	6.01	73.95	79.96
110.	50249.9	14.01	73.00	364.73	7.19	88.71	95.90
120.	54818.1	15.07	78.55	432.58	8.44	104.56	113.01
130.	59386.2	16.09	83.85	505.62	9.77	121.43	131.19
140.	60000.0	16.22	84.54	515.81	9.95	123.76	133.71

DEL P FOR DIFFERENT LOAD (AT 35.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4610.4	1.40	7.29	3.14	0.07	0.79	0.86
20.	9220.8	2.79	14.57	12.57	0.26	3.17	3.43
30.	13831.2	4.18	21.79	28.29	0.59	7.11	7.70
40.	18441.6	5.55	28.95	50.29	1.04	12.61	13.65
50.	23052.0	6.91	36.00	78.55	1.62	19.64	21.26
60.	27662.4	8.24	42.93	113.04	2.31	28.17	30.48
70.	32272.8	9.54	49.70	153.72	3.13	38.15	41.28
80.	36883.2	10.80	56.30	200.51	4.05	49.54	53.58
90.	41493.6	12.03	62.69	253.33	5.07	62.27	67.34
100.	46104.0	13.21	68.86	312.06	6.20	76.27	82.47
110.	50714.4	14.35	74.79	376.55	7.41	91.48	98.89
120.	55324.8	15.44	80.46	446.62	8.70	107.82	116.51
130.	59935.2	16.47	85.86	522.06	10.06	125.18	135.25
140.	60000.0	16.49	85.93	523.16	10.08	125.44	135.52

DEL P FOR DIFFERENT LOAD (AT 40.0 DEG C)

LOAD	FLOW	V1	V2	DELP	HLC	HLD	HLT
10.	4665.2	1.44	7.50	3.26	0.07	0.82	0.89
20.	9330.4	2.87	14.98	13.03	0.27	3.28	3.55
30.	13995.5	4.30	22.41	29.31	0.61	7.37	7.97
40.	18660.7	5.71	29.76	52.10	1.08	13.06	14.14
50.	23325.9	7.10	37.01	81.39	1.67	20.35	22.02
60.	27991.1	8.46	44.12	117.13	2.40	29.18	31.57
70.	32656.3	9.80	51.07	159.29	3.24	39.51	42.75
80.	37321.5	11.10	57.84	207.79	4.19	51.30	55.49
90.	41986.6	12.35	64.39	262.53	5.25	64.47	69.72
100.	46651.8	13.57	70.71	323.41	6.41	78.96	85.37
110.	51317.0	14.73	76.77	390.26	7.66	94.69	102.35
120.	55982.2	15.84	82.56	462.90	8.99	111.58	120.57
130.	60000.0	16.75	87.33	529.92	10.20	126.97	137.17