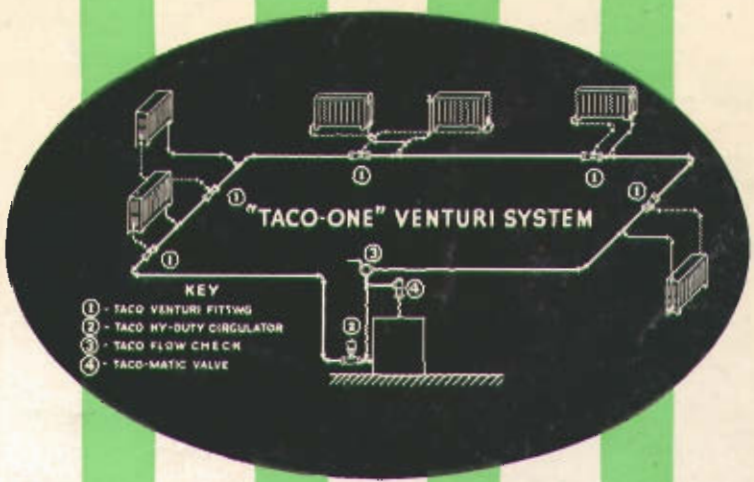
DESIGNING SIMPLIFIED *for* TACO VENTURI SYSTEMS

USING

RADIATORS
CONVECTORS
BASE BOARDS



Taco

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Designing Simplified for Taco Venturi Systems

Taco's SIMPLE but SCIENTIFIC method of accurately sizing the Circulator, Venturi Fittings and piping for one pipe forced hot water heating systems was developed to assure a satisfactory installation with a minimum of cost.

It permits you to make full use of the capacity of the Circulator and piping, and, more often than not, smaller mains can be used safely. At the same time it offers you a selection of various size mains as well as a choice of one or two circuits.

This new method is based on the use of "pipe equivalents" which means that all parts of the system that create friction losses (Boiler, Elbows, Tees, Valves, Venturi Fittings, Flow Checks, etc.) have been expressed in lineal feet of piping. For example, the friction loss thru a 1" 90° elbow is equal to the friction loss of 2 feet of 1" pipe. Similarly the Boiler, Flow Check, Valves, Tees, etc. have their own "pipe equivalents." However, these items, as well as extra fittings in the main, need not be calculated as they have been taken into consideration in arriving at the figures shown in Table 3.

The use of this method is so simple that it is only necessary to determine the approximate length of the main and multiply the number of Venturi Fittings required by the "pipe equivalents" listed at the bottom of Table 2.

When used regularly, we know of no other method which even approaches the accuracy and speed of Tables 2 and 3.

Just Follow These Six Simple Steps:—

STEP 1—Calculate Heat Loss

STEP 2—Determine Main Size (Table 2, Page 6)

STEP 3—Determine length of Main and add "Pipe Equivalents" of Venturi Fittings (Table 2, Page 6)

STEP 4—Select Taco Circulator (Table 3, Page 7)

STEP 5—Determine Branch Sizes (Table 3, Page 7)

STEP 6—Select Boiler

Special Notes

1. BASEBOARDS—This method is suitable for use with Baseboards provided the friction head of the Baseboard does not exceed that of a ¾" pipe of the same length (Obtain friction head from Baseboard Manufacturer).

2. CONVECTORS—Tables 2 and 3 are suitable for use with convectors, except when a 10°F. temperature drop thru system is required. In this latter case it is necessary to multiply figures in column 1 of Table 2 and figures in columns 3, 9, 10, 11, 12, 13 and 14 of Table 3 by .5 before selecting circuit, circulator and branch sizes. All tables herein are based on the standard 20°F. temperature drop. A temperature drop of 10°F. requires double the flow, which is accomplished by following the above procedure.

3. If the total length of the supply and return lateral branches to radiator are longer than 15 feet, radiator capacities in columns 9 thru 14 (Table 3) should be *reduced* 1% for each additional foot of pipe and for each additional elbow if more than 8 are used.

4. Vertical branches feeding radiators below the main and more than 8 feet high should be increased one size.

5. If radiation has been calculated in "square feet" using short cut methods, convert to Btu as indicated in Table 1.

6. If two circuits are used, do this:—
   a — Make trunk one size larger than circuits.
   b — Install balancing valves on the return line of each circuit.
   c — Divide heating load on each circuit as evenly as possible with not more than 60% of total load on any one circuit.

7. If radiation is selected to operate at temperatures above 170°F-150 Btu., boiler must be selected on the basis of its output in Btu rather than square feet (See Table 1).

8. Allowance for domestic hot water need only be made in the selection of a boiler if there are more than two bathrooms to be served, in which cases the following allowances should be made:—
   STORAGE HEATERS — 120 Btu per hour for each gallon of storage tank capacity.
   TANKLESS HEATERS — 12,000 Btu per hour for each bathroom in excess of two.

9. UNIT HEATERS & RADIANT PANELS—Because of the high resistance and the large volume of water required to be pumped thru Unit Heaters and Radiant Panels, which exceed the capacity of a Venturi Fitting, it is recommended that they be installed on a two pipe rather than a one pipe circuit.

10. EXPANSION TANKS—Capacity should be not less than one gallon for each 30 square feet of radiation.

Example No. 1—A Single Circuit Job

STEP 1—Calculate heat loss in accordance with I-B-R Guides or other accepted methods. If radiation is figured in square feet it must be converted to BTU as indicated at bottom of Table 1.

Example

Assume a job where the heat loss is calculated as 353 Sq. Ft. of 170 Btu radiation (180°F.—See Table 1. This represents the average water temperature in the radiator—190°F. inlet temperature, 170°F. outlet temperature or a 20°F. temperature drop) for a total of 60,000 Btu. Also assume there are 12 radiators on the job.

STEP 2—Determine main size using Table 2, Page 6.

Example

In Step 1 we learned that our total load is 60,000 Btu. Referring to Table 2 (Col. 1) we find that for this load we have a choice of using:

¾" pipe.....2 Circuits
1" pipe.....1 Circuit
1" pipe.....2 Circuits
1¼" pipe.....1 Circuit

Your choice may depend upon a difference in cost of smaller size pipe and fittings and/or installation problems. However, for this purpose we will use a single circuit 1" Main. (Col. 3)

STEP 3—Determine "pipe equivalents" of mains and Venturi Fittings by measuring length of main and adding "pipe equivalents" of Venturi Fittings. (Table 2)

Example

Let us assume that the main measures 110 feet. To this we add the "pipe equivalent" of 12 — 1" Venturi Fittings. Referring to the bottom of Table 2 under the 1" column we find that each 1" Venturi Fitting is equivalent to 10 feet of 1" pipe. Therefore the total "pipe equivalent" for the Venturi Fittings and main will be:

12—1" Venturi Fittings × 10	120' of "Pipe Equivalent"
Length of 1" Main	110' of Pipe
Total "Pipe Equivalent"	230'

STEP 4—From Table 3, select Taco Circulator which will handle 230 feet of "pipe equivalent" with a total load of 60,000 Btu and one 1" circuit.

Example

From Table 3, in 1" section (Col. 1) 60,000 Btu's (Col. 3) and 1 circuit (Col. 4) all on line 9, we find the nearest above 230 feet of "pipe equivalent" is 300 (Col. 6) which is a Taco Hy-Duty Circulator. (Note: Taco Hy-Duty Circulators can be supplied with 1", 1¼" or 1½" flanges at the same price). If no circulator listed would carry the load required, recalculate Step 3 using two circuits or one size larger single circuit.

STEP 5—Determine branch sizes using columns 9 thru 14 of Table 3.

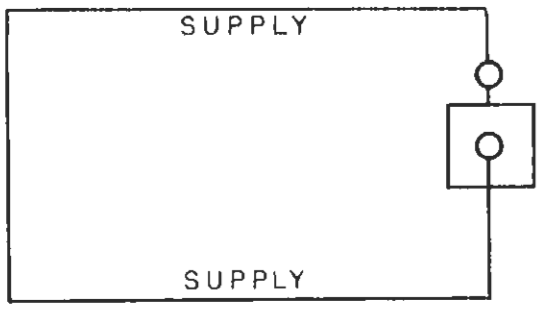
Example

In Step 4 we selected the circulator from line 9 so we use this same line to determine branch sizes. On this same line we find that for a radiator up to 13,200 Btu above main, use ½" pipe or tubing (Col. 9). For a radiator over 13,200 Btu but not more than 19,500 Btu use ¾". (Col. 10). For below main radiators use same line, Columns 12, 13, or 14. If radiator is larger than capacities listed it will be necessary to install 2 smaller radiators.

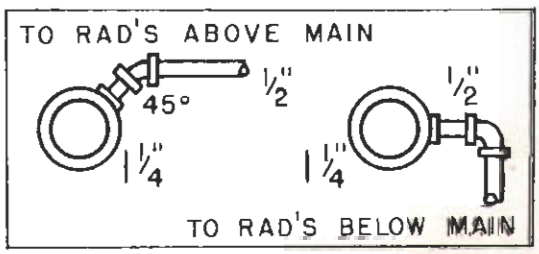
STEP 6—Select Boiler based on water temperature used to size radiation.

Example

Square foot ratings of most boilers are based on 170°F. water (150 Btu) so for this example select a boiler with a net rating of 400 Sq. Ft. (60,000 ÷ 150) or 60,000 Btu.



SINGLE CIRCUIT



DETAIL OF SUPPLY AND RETURN LATERAL CONNECTION TO MAIN

Example No. 1—A Single Circuit Job

STEP 1—Calculate heat loss in accordance with I-B-R Guides or other accepted methods. If radiation is figured in square feet it must be converted to BTU as indicated at bottom of Table 1.

Example

Assume a job where the heat loss is calculated as 353 Sq. Ft. of 170 Btu radiation (180°F.—See Table 1. This represents the average water temperature in the radiator—190°F. inlet temperature, 170°F. outlet temperature or a 20°F. temperature drop) for a total of 60,000 Btu. Also assume there are 12 radiators on the job.

STEP 2—Determine main size using Table 2, Page 6.

Example

In Step 1 we learned that our total load is 60,000 Btu. Referring to Table 2 (Col. 1) we find that for this load we have a choice of using:

¾" pipe.....2 Circuits
1" pipe.....1 Circuit
1" pipe.....2 Circuits
1¼" pipe.....1 Circuit

Your choice may depend upon a difference in cost of smaller size pipe and fittings and/or installation problems. However, for this purpose we will use a single circuit 1" Main. (Col. 3)

STEP 3—Determine "pipe equivalents" of mains and Venturi Fittings by measuring length of main and adding "pipe equivalents" of Venturi Fittings. (Table 2)

Example

Let us assume that the main measures 110 feet. To this we add the "pipe equivalent" of 12 — 1" Venturi Fittings. Referring to the bottom of Table 2 under the 1" column we find that each 1" Venturi Fitting is equivalent to 10 feet of 1" pipe. Therefore the total "pipe equivalent" for the Venturi Fittings and main will be:

12—1" Venturi Fittings	× 10 =	120' of "Pipe Equivalent"
Length of 1" Main	=	110' of Pipe
Total "Pipe Equivalent"		230'

STEP 4—From Table 3, select Taco Circulator which will handle 230 feet of "pipe equivalent" with a total load of 60,000 Btu and one 1" circuit.

Example

From Table 3, in 1" section (Col. 1) 60,000 Btu's (Col. 3) and 1 circuit (Col. 4) all on line 9, we find the nearest above 230 feet of "pipe equivalent" is 300 (Col. 6) which is a Taco Hy-Duty Circulator. (Note: Taco Hy-Duty Circulators can be supplied with 1", 1¼" or 1½" flanges at the same price). If no circulator listed would carry the load required, recalculate Step 3 using two circuits or one size larger single circuit.

STEP 5—Determine branch sizes using columns 9 thru 14 of Table 3.

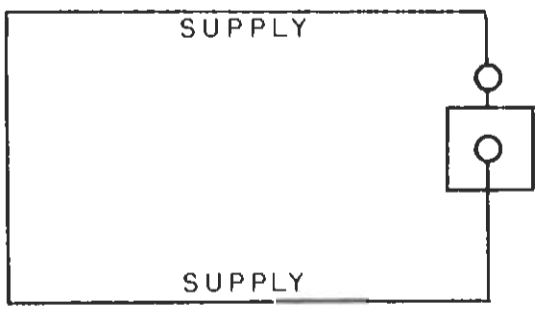
Example

In Step 4 we selected the circulator from line 9 so we use this same line to determine branch sizes. On this same line we find that for a radiator up to 13,200 Btu above main, use ½" pipe or tubing (Col. 9). For a radiator over 13,200 Btu but not more than 19,500 Btu use ¾". (Col. 10). For below main radiators use same line, Columns 12, 13, or 14. If radiator is larger than capacities listed it will be necessary to install 2 smaller radiators.

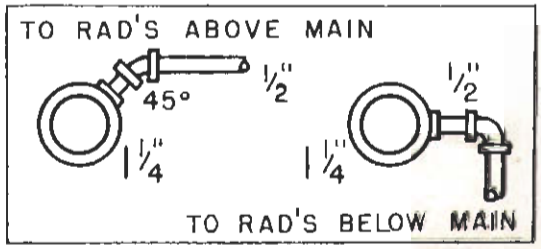
STEP 6—Select Boiler based on water temperature used to size radiation.

Example

Square foot ratings of most boilers are based on 170°F. water (150 Btu) so for this example select a boiler with a net rating of 400 Sq. Ft. (60,000 ÷ 150) or 60,000 Btu.



SINGLE CIRCUIT



DETAIL OF SUPPLY AND RETURN LATERAL CONNECTION TO MAIN

Example No. 2—A Two Circuit Job

STEP 1—Calculate heat loss in accordance with I-B-R Guides or other accepted methods. If radiation is figured in square feet it must be converted to BTU as indicated at bottom of Table 1.

Example

Assume a job where the heat loss is calculated as 640 Sq. Ft. of 210 Btu radiation (200°F.—See Table 1. This represents the average water temperature in the radiator — 210°F. inlet temperature, 190°F. outlet temperature or a 20°F. temperature drop) for a total of 134,400 Btu. Also assume there are 20 radiators on the job.

STEP 2—Determine main size using Table 2, Page 6.

Example

In Step 1 we learned that our total load is 134,400 Btu. From Table 2 we find that the nearest figure shown above this load is 140,000 (Col. 1) and a choice of using:—

1¼" pipe.....1 Circuit
1¼" pipe.....2 Circuits
1½" pipe.....1 Circuit
1½" pipe.....2 Circuits

Your choice may depend upon a difference in cost of smaller size pipe and fittings and/or installation problems. However, for this purpose we will use 1¼" pipe and 2 circuits. (Note that our trunk must be 1½" as indicated at top of the Table).

STEP 3—Determine "pipe equivalents" of mains and Venturi Fittings by measuring length of mains and adding "pipe equivalents" of Venturi Fittings. (Table 2)

Example

Since we are using 2 circuits, let's assume that the first circuit including trunk measures 100 feet and will carry 12 Venturi Fittings and the second circuit measures 125 feet and will carry 8 Venturi Fittings. (Note-Trunk is included in each case since the circulator is selected on the highest "pipe equivalent.") The total "pipe equivalent" will then be:—

	1st Circuit	2nd Circuit
Length of Circuit including trunk— (Measured Length)	100 Ft.	125 Ft.
"Pipe Equivalents" for Venturi Fittings		
12 Venturi Fittings x 10 (See bottom of Table 2) —	120 Ft.	—
8 Venturi Fittings x 10 (See bottom of Table 2) -	—	80 Ft.
Pipe Equivalent Total	220 Ft.	205 Ft.

Altho the length of the first circuit is shorter than the second, the "pipe equivalent" is higher due to the greater number of Venturi Fittings, so we use the higher of the two to select the circulator. (Note—when using two circuits, try to divide the total load in Btu or square Feet as evenly as possible. Caution—not more than 60% of total load should be put on any one circuit).

STEP 4—From Table 3, select Taco Circulator which will handle 220 feet of "pipe equivalent" with a total load of 134,400 Btu and 2 - 1¼" Circuits.

Example

From Table 3, in 1¼" section (Col. 1), 140,000 Btu's (Col. 3) (nearest above 134,000) and 2 circuits (Col. 4) all on line 25, we find that either a Taco Standard Horizontal or Vertical Circulator rated at 520 (Col. 5) feet of "pipe equivalent" can be used being nearest to and above the 220 feet of "pipe equivalents" required. (Note—The Taco Standard Horizontal or Vertical Circulator can be supplied with 1", 1¼" or 1½" flanges).

STEP 5—Determine branch sizes using last columns 9 thru 14 of Table 3.

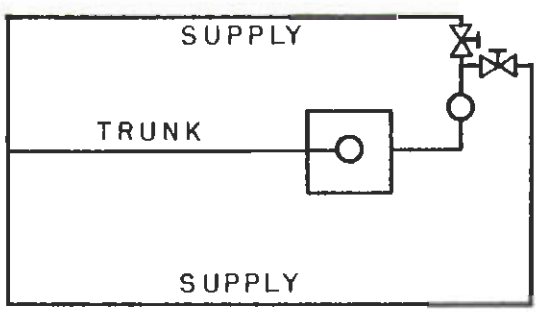
Example

In Step 4 we selected the circulator from line 25 so we use this same line to determine branch sizes. On this same line we find that for a radiator up to 8,200 Btu above main, use ½" pipe or tubing. (Col. 9) For a radiator over 8,200 Btu but not more than 12,600 Btu, use ¾". (Col. 10) For a radiator over 12,600 Btu but not more than 20,600 Btu use 1". For below main radiators use same line. Cols., 12, 13 & 14. If radiator is larger than capacities listed, it will be necessary to install 2 smaller radiators.

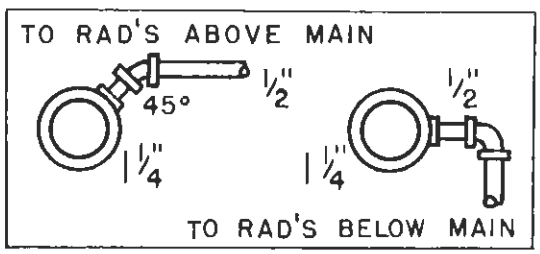
STEP 6—Select Boiler based on water temperature used to size radiation.

Example

A boiler with a net load rating of 134,400 Btu or higher would be satisfactory for this job if no more than 2 bathrooms were to be served. If more than 2 bathrooms are to be served, see Item 8 under "Special Notes." If Boiler is selected on a square foot basis it is necessary to select one rated at 134,400 ÷ 150 (Btu basis on which most boilers are rated) = 890 Sq. Ft.



DOUBLE CIRCUIT



DETAIL OF SUPPLY AND RETURN LATERAL CONNECTION TO MAIN

Example No. 3—A Multiple Circuit Job

Tables 2 and 3 are not suitable for all multiple circuit installations. They may, however, be used on Garden Apartments and other large installations where the control of each circuit is desired by the use of individual circulators.

For this type of installation, treat each circuit as an individual job and follow exactly the same procedure as outlined in Steps 1, 2, 3, 4 and 5 in EXAMPLE NO. 1 — SINGLE CIRCUIT or EXAMPLE NO. 2 — TWO CIRCUITS depending upon the installation requirements.

After the pipe, branch and circulator sizes are determined for each circuit, refer to Table 4 to select main size to feed all circuits and the circulator size to pump water thru the main only.

Example

Assume a main 400 feet long (Supply & Return) will carry a total load of 600,000 Btu per hour. From Table 4 you will find that a 3" main with a 2½" Taco Circulator is required.

The purpose of this circulator is to keep hot water circulating thruout the entire main at all times, so that when heat is required for any or all circuits, hot water is instantly available.

The diagram below shows a typical layout for a six circuit installation.

Controls

The above type of installation is predicated on the use of an individual control for each circuit.

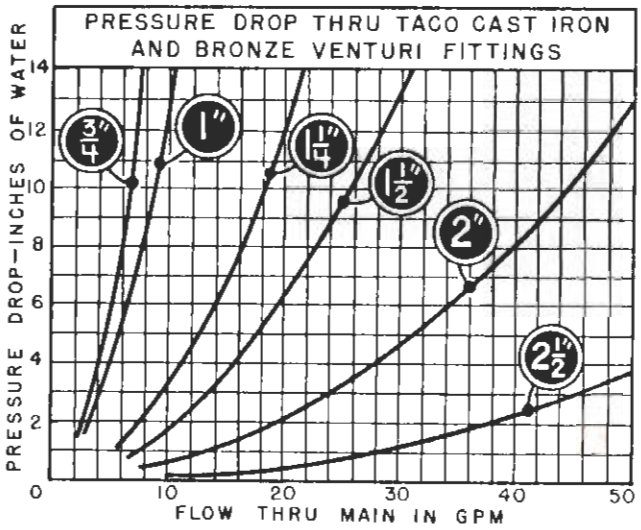
TABLE NO. 4

For Sizing Mains and Circulators on Multiple Circuit Installations

Total BTU per Hour	Length of Supply & Return Main Feet	* Size Main Required	** Size Taco Circulator Required
Up to 300,000	Up to 1000'	2"	2" Std. Vertical
300,001 to 450,000	Up to 1000'	2½"	2" Std. Vertical
450,000 to 850,000	Up to 1000'	3"	2½" Std. Vertical
850,000 to 1,250,000	Up to 1000'	3½"	2½" Std. Vertical

* Main size may be reduced at proper radiation intervals.

** These circulators required to pump water thru the main only. Separate circulators are required for the individual circuits.



TYPICAL LAYOUT MULTIPLE CIRCUIT INSTALLATION

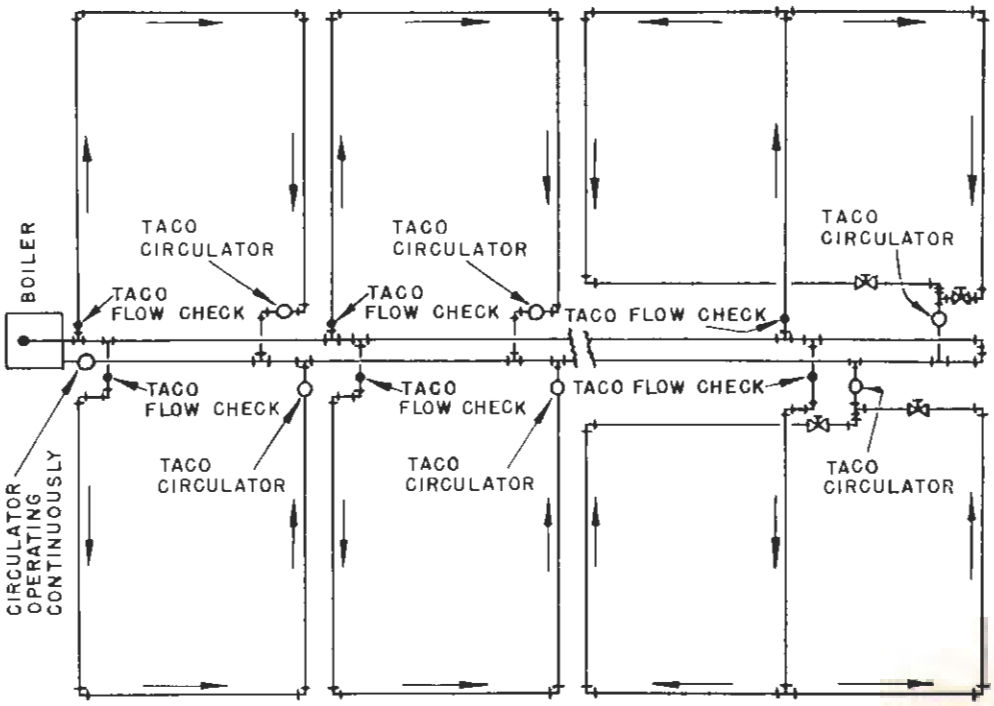


Table 1

HEAT EMISSION RATES
For Various Radiator Temperatures
(Room Temperature 70°F.)

Average Radiator Temperature	Heat Emission Rates Btu per square foot of radiation
170	150
180	170
190	190
200	210
210	230

HOW TO USE TABLE 1

Converting Square Feet to BTU

To convert radiation in square feet to Btu, multiply radiation in square feet by the corresponding heat emission factor shown above.

Example

Assume you have calculated a total load of 400 square feet of radiation based on the use of some short cut method. Since most short cut methods are based on 170 degree water in the radiators, multiply 400 x 150 (Btu emission rate for 170°F. water) 60,000 Btu total load. The Btu capacity of each radiator can be obtained by following the same procedure.

Converting BTU to Square Feet

To convert radiation from Btu to square feet, divide Btu by heat emission rate at which radiation was calculated.

Example

Assume a 10,000 Btu radiator calculated at 210 Btu (200°F. water). Divide 10,000 by 210 = 48 square feet. The total load can be similarly calculated.

Table 2

FOR SELECTING NUMBER & SIZE OF CIRCUITS FOR TACO VENTURI SYSTEMS

(Using Steel or Copper Pipe)

Total Btu/Hr. Based on Temperature Drop of 20°F.	NUMBER AND SIZE OF CIRCUITS Trunk to Be One Pipe Size Larger if 2 Circuits Are Used					
	¾"	1"	1¼"	1½"	2"	2½"
1	2	3	4	5	6	7
20,000	1					
30,000	1					
40,000	1 2	1				
50,000	2	1				
60,000	2	1 2	1			
70,000		1 2	1			
80,000		2	1			
90,000		2	1			
100,000		2	1 2	1		
120,000			1 2	1		
140,000			1 2	1 2		
160,000			2	1 2		
180,000			2	1 2		
200,000			2	2	1	
250,000				2	1 2	
300,000				2	1 2	1
350,000				2	2	1
400,000				2	2	1 2
450,000				2	2	1 2
500,000					2	2
550,000						2
600,000						2
650,000						2
	Equivalent Feet of Pipe for Each Venturi Fitting					
	10'	10'	10'	10'	10'	10'

Table 3

ONE AND TWO CIRCUIT TACO VENTURI SYSTEMS

(For Steel or Copper Pipe)

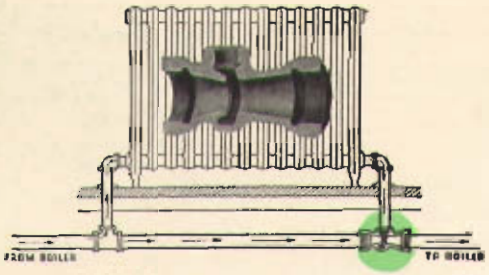
Circuit Size	Line	Total Btu/Hr. Based on 20°F. Temp. Drop	No. of Circuits	Circulator Size Based On Feet of Pipe Equivalents**				Branch Sizes—Radiator Capacities in Thousands Btu per Hr. Based On 20°F. Temperature Drop†					
								Radiators Above Main†			Radiators Below Main†		
				1", 1¼" or *1½" H.C. or V.C. Standard	1", 1¼" or 1½" Vertical Hy-Duty	2" Vertical Standard	2½" Vertical Standard	½"	¾"	1"	½"	¾"	1"
1	2	3	4	5	6	7	8	9	10	11	12	13	14
¾"	1	20,000	1	520	850	—	—	8.0	—	—	6.8	—	—
	2	30,000	1	220	390	—	—	10.0	—	—	8.5	—	—
	3	40,000	1	100	200	—	—	12.0	—	—	10.2	—	—
	4	40,000	2	520	850	—	—	8.0	—	—	6.8	—	—
	5	50,000	2	330	570	—	—	9.0	—	—	7.6	—	—
	6	60,000	2	220	380	—	—	10.0	—	—	8.5	—	—
1 "	7	40,000	1	500	830	—	—	8.8	14.0	—	7.5	11.9	—
	8	50,000	1	260	460	—	—	11.0	16.8	—	9.3	14.3	—
	9	60,000	1	160	300	—	—	13.2	19.5	—	11.2	16.6	—
	10	70,000	1	100	210	—	—	15.4	22.7	—	13.1	19.3	—
	11	60,000	2	780	1290	—	—	7.0	11.0	—	6.0	9.3	—
	12	70,000	2	570	960	—	—	8.0	12.4	—	6.8	10.5	—
	13	80,000	2	480	820	—	—	9.0	13.9	—	7.7	11.8	—
	14	90,000	2	330	590	—	—	10.0	15.3	—	8.5	13.1	—
	15	100,000	2	240	440	—	—	11.0	16.8	—	9.3	14.3	—
1¼"	16	60,000	1	860	1410	—	—	7.0	11.0	16.5	6.0	9.3	14.0
	17	70,000	1	580	980	—	—	8.2	12.6	19.0	7.0	10.7	16.2
	18	80,000	1	460	800	—	—	9.4	14.4	21.7	8.0	12.2	18.5
	19	90,000	1	350	620	—	—	10.5	16.2	24.4	8.9	13.8	20.8
	20	100,000	1	260	480	—	—	11.7	18.0	27.0	9.9	15.3	23.0
	21	120,000	1	160	330	—	—	14.0	21.0	31.6	11.9	17.8	26.7
	22	140,000	1		210	—	—	16.4	24.0	36.0	14.0	20.4	30.6
	23	100,000	2	1280	2150	—	—	6.0	10.2	16.7	5.1	8.6	14.2
	24	120,000	2	810	1370	—	—	7.0	11.0	18.0	6.0	9.3	15.3
	25	140,000	2	520	930	—	—	8.2	12.6	20.6	7.0	10.7	17.5
	26	160,000	2	410	740	—	—	9.4	14.4	23.6	8.0	12.2	20.1
	27	180,000	2	300	560	—	—	10.5	16.2	26.4	8.9	13.8	22.5
	28	200,000	2	220	410	—	—	11.7	18.0	29.5	9.9	15.3	25.1
1½"	29	100,000	1	700	1220	—	—	7.5	12.0	18.0	6.4	10.2	15.3
	30	120,000	1	420	760	—	—	8.5	14.4	21.6	7.2	12.2	18.4
	31	140,000	1	260	520	—	—	9.4	16.8	25.2	8.0	14.2	21.4
	32	160,000	1	180	370	—	—	10.7	19.2	28.8	9.1	16.3	24.5
	33	180,000	1	120	280	—	—	12.0	21.6	32.4	10.2	18.3	27.5
	34	140,000	2	1320	2260	—	—	5.5	8.4	12.6	4.7	7.1	10.7
	35	160,000	2	990	1690	—	—	6.2	9.6	15.4	5.2	8.1	13.1
	36	180,000	2	800	1340	—	—	6.8	10.8	18.0	5.8	9.2	15.4
	37	200,000	2	610	1060	—	1160	7.5	12.0	21.2	6.4	10.2	18.0
	38	250,000	2	320	550	470	720	8.7	15.0	24.0	7.4	12.7	20.4
	39	300,000	2	140	210	280	430	10.0	18.0	27.0	8.5	15.3	22.9
	40	350,000	2	—	—	160	270	11.3	21.0	31.5	9.6	17.8	26.7
2 "	41	200,000	1	590	1040	840	1140	10.5	15.5	22.0	8.9	13.2	18.7
	42	250,000	1	300	530	470	700	13.0	19.3	27.0	11.0	16.4	22.9
	43	300,000	1	—	190	260	410	15.0	23.2	32.0	12.8	19.7	27.2
	44	250,000	2	1360	2140	1970	2710	6.7	12.3	21.0	5.7	10.5	17.8
	45	300,000	2	790	1020	1250	1770	8.1	13.7	22.2	6.9	11.6	18.9
	46	350,000	2	—	440	930	1340	9.4	15.1	23.4	8.0	12.7	19.9
	47	400,000	2	—	—	640	970	10.8	16.5	24.6	9.2	14.0	20.9
	48	450,000	2	—	—	410	680	12.1	17.9	25.8	10.3	15.2	21.9
	49	500,000	2	—	—	250	480	13.5	19.3	27.0	11.5	16.4	22.9
2½"	50	300,000	1	—	690	840	1210	8.6	14.0	21.0	7.3	11.9	17.9
	51	350,000	1	—	200	520	780	10.3	15.3	24.0	8.7	13.0	20.4
	52	400,000	1	—	—	330	550	11.6	16.7	27.0	9.8	14.2	23.0
	53	450,000	1	—	—	200	370	13.0	18.0	30.0	11.0	15.3	25.5
	54	400,000	2	—	—	1620	2320	5.8	10.0	18.0	4.9	8.5	15.3
	55	450,000	2	—	—	1020	1570	6.5	11.0	19.2	5.5	9.3	16.3
	56	500,000	2	—	—	690	1190	7.2	12.0	20.4	6.1	10.2	17.3
	57	550,000	2	—	—	430	920	8.0	13.0	21.6	6.8	11.0	18.4
	58	600,000	2	—	—	220	640	8.6	14.0	22.8	7.3	11.9	19.4
	59	650,000	2	—	—	—	440	9.4	15.0	24.0	8.0	12.9	20.4

*HC represents Horizontal Circulator (Note: 1" is available with ¾" Flanges) VC represents Vertical Circulator.

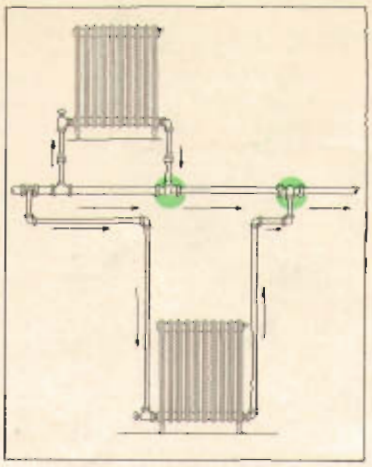
** The capacities listed take into consideration the feet of pipe equivalents of Boiler, Flow Check, Pipes Fittings around Boiler and extra fittings in mains.

† If the total length of the supply and return lateral branches to radiators are longer than 15 feet, these capacities should be reduced 1% for each additional foot of pipe beyond 15 feet and/or each elbow in excess of 8.

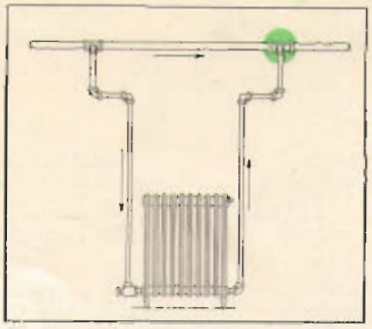
RADIATOR CONNECTION DETAILS



Single radiator above main in "Taco-One" Venturi System. Sectional view of fitting shown superimposed.

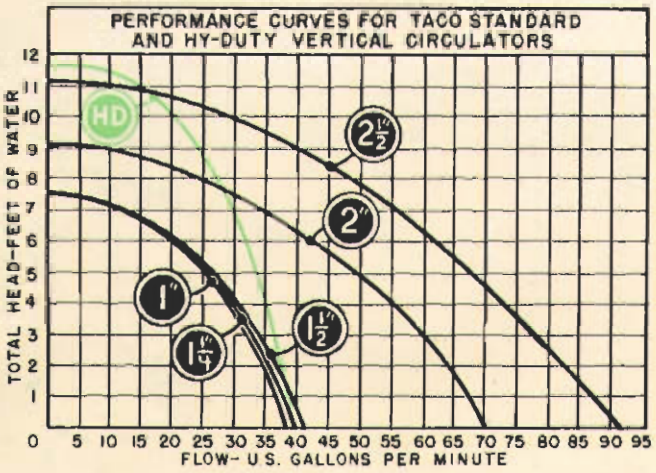


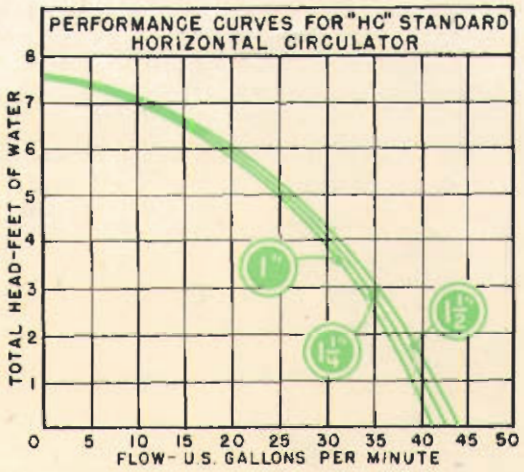
Radiators above and below main on "Taco-One" Venturi System.



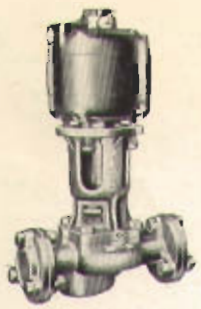
Radiator below main on "Taco-One" Venturi System.

NOTE–Only one Taco Venturi Fitting is required per radiator and that the same fitting can be used for radiators above or below the main.

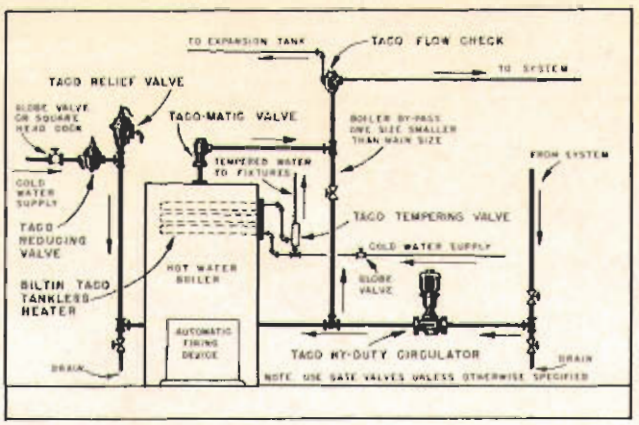


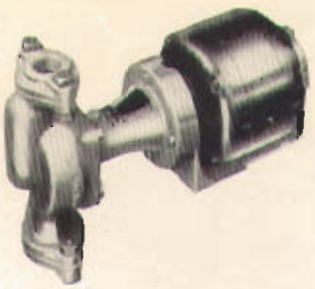


BOILER CONNECTION DETAILS



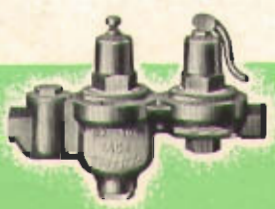
Taco Vertical Circulator





Taco Horizontal Circulator

Taco-Vent



Taco Comb. Control No. 100

Taco Flow-Check

Taco-Matic Valve

Tankless Taco

Form No. 490189 Printed in U.S.A.