WEIL-McLAIN

EASY-LOOP BOOKLET

FOR ESTIMATING RESIDENTIAL HYDRONIC SYSTEMS

FEATURES:

- HEAT LOSS CALCULATION
- BOILER & BASEBOARD SELECTION
- PIPE SIZING
- JOB QUOTATION

This Manual provides simplified procedures for designing an Easy-Loop Hydronic System using Weil-McLain Boilers, Convector Baseboard and Series-Loop piping.

In this system, 3/4" Convector Baseboard serves as a part of the system piping. This series loop design offers all the unequalled advantages of modern forced hot water heating and may be used in all types of residential construction.

By following the simplified design and estimating procedures in this Manual, the hydronic heating contractor will quickly be able to provide price estimates for more jobs with less effort. Once a job has been sold, a complete I=B=R calculation and piping layout should be made to accurately locate the necessary baseboard panels in each room; thus little time need be expended upon any job except those that are sold.

WEIL-McLAIN

A Marley Company

Michigan City, Indiana 46360

FEATURES OF AN EASY-LOOP SYSTEM

Installation time and material costs are substantially reduced with an Easy-Loop system since the convector baseboard eliminates a major portion of the piping. Actual tests have proven that installation time can be reduced over 50% and piping material costs reduced a like amount by eliminating pipe, pipe fittings, radiator union ells, radiator valves, etc. Listed below are other major features and advantages of a Weil-McLain Easy-Loop System.

1. The appreciably lower installed cost assures the availability of a quality hydronic heating system for more home owners.

2. Adaptable to all types of residential construction including ranch, two story, basementless, split level homes and multiple apartment units.

3. Zoning can be provided at low additional cost through the use of more than one loop, and with zone valves or circulators.

4. Comfort conditions in the home are equivalent to a system using a conventional one-pipe system.

5. Can be installed in basementless and slab type ranch homes at costs which are comparable to a warm air system.

The following simple steps provide an accurate "short-cut" method for designing an Easy-Loop System.

STEP 1. ESTIMATE TOTAL HEAT LOSS

Select from the Construction Design Table, those features that best identify the construction for the area which is to be heated. Choose the appropriate heat loss according to square feet of floor area and record this heat loss in the proper line below. Repeat this procedure for other areas. Determine design temperature difference for the locale and the corresponding correction factor on Page 4. Then multiply total heat loss calculated for each area by the correction factor to obtain the adjusted heat loss on which to base boiler selection.

NOTE: Do not add in heat losses for basements which are not to be heated. Ignore crawl spaces which are open to basement areas. Make deduction from first floor heat loss for two story structures.

LEVEL	CONSTRUCTION NO.	AREA SQ. FT.	HEAT LOSS AT 70°F. DESIGN TEMP. DIFF.	CORRECTION FACTOR AT ___ °F.	ADJUSTED HEAT LOSS (TO NEAREST TEN)
FIRST LEVEL			_____	X _____	= _____
SECOND LEVEL			_____	X _____	= _____
MID-LEVEL			_____	X _____	= _____
BASEMENT			_____	X _____	= _____
FLOOR			_____	X _____	= _____
				TOTAL ADJUSTED HEAT LOSS =	_____

EXAMPLE:

26' x 50' Ranch type house, single story (8 ft. ceiling) with basement, 1300 sq. ft. floor area.

Construction: Double glass, weatherstripped, 2" wall insulation, 3" ceiling insulation.

Design temperature difference: 80°F.

Owners wish to heat first floor and basement.

Owners wish to zone into living, sleeping, and basement areas.

By following the instructions in Step 1 and using this example, the total adjusted heat loss is calculated as shown below.

LEVEL	CONSTRUCTION NO.	AREA SQ. FT.	HEAT LOSS AT 70°F. DESIGN TEMP. DIFF.	CORRECTION FACTOR AT 80°F.	ADJUSTED HEAT LOSS (TO NEAREST TEN)
FIRST LEVEL	5	1300	37,340	X 1.15	= 42,940
SECOND LEVEL			_____	X _____	= _____
MID-LEVEL			_____	X _____	= _____
BASEMENT	22	1300	13,340	X 1.15	= 15,340
FLOOR			_____	X _____	= _____
				TOTAL ADJUSTED HEAT LOSS =	58,280

CONSTRUCTION DESIGN TABLE

(8 FT. CEILING HEIGHT)

CONSTRUCTION NO. 1 Single glass, weatherstripped 1" Wall Insulation 2" Ceiling Insulation	**CONSTRUCTION NO. 2** Double glass, weatherstripped 1" Wall Insulation 2" Ceiling Insulation	**CONSTRUCTION NO. 3** Single glass, weatherstripped 1" Wall Insulation 3" Ceiling Insulation
CONSTRUCTION NO. 4 Double glass, weatherstripped 1" Wall Insulation 3" Ceiling Insulation	**CONSTRUCTION NO. 5** Double glass, weatherstripped 2" Wall Insulation 3" Ceiling Insulation	**CONSTRUCTION NO. 6** Double glass, weatherstripped 3" Wall Insulation 3" Ceiling Insulation
CONSTRUCTION NO. 7 Double glass, weatherstripped 3" Wall Insulation 6" Ceiling Insulation 2" Floor Insulation	**CONSTRUCTION NO. 8** Double glass, weatherstripped 3" Wall Insulation 6" Ceiling Insulation Full Basement or Crawl Space	**CONSTRUCTION NO. 9** Double glass, weatherstripped 3" Wall Insulation 9" Ceiling Insulation Full Basement or Crawl Space
CONSTRUCTION NO. 10 Double glass, weatherstripped 3" Wall Insulation 12" Ceiling Insulation Full Basement or Crawl Space	**CONSTRUCTION NO. 11** Double glass, weatherstripped 6" Wall Insulation 6" Ceiling Insulation Full Basement or Crawl Space	**CONSTRUCTION NO.12** Double glass, weatherstripped 6" Wall Insulation 9" Ceiling Insulation Full Basement or Crawl Space
CONSTRUCTION NO. 13 Double glass, weatherstripped 6" Wall Insulation 12" Ceiling Insulation Full Basement or Crawl Space	**CONSTRUCTION NO. 14** 4" Brick, 4" Light Weight Block Furred, Lath and Plaster 2" Ceiling Insulation Single Glass, Weatherstripped	**CONSTRUCTION NO. 15** 4" Brick, 4" Light Weight Block Furred, Lath and Plaster 2" Ceiling Insulation Double Glass, Weatherstripped
CONSTRUCTION NO. 16 4" Brick, 4" Light Weight Block Furred, Lath and Plaster 3" Ceiling Insulation Single Glass, Weatherstripped	**CONSTRUCTION NO. 17** 4" Brick, 4" Light Weight Block Furred, Lath and Plaster 3" Ceiling Insulation Double Glass, Weatherstripped	**CONSTRUCTION NO. 18** 8" Brick, Furred, Lath and Plaster 2" Ceiling Insulation Single Glass, Weatherstripped
CONSTRUCTION NO. 19 8" Brick, Furred, Lath and Plaster 2" Ceiling Insulation Double Glass, Weatherstripped	**CONSTRUCTION NO. 20** 8" Brick, Furred, Lath and Plaster 3" Ceiling Insulation Single Glass, Weatherstripped	**CONSTRUCTION NO. 21** 8" Brick, Furred, Lath and Plaster 3" Ceiling Insulation Double Glass, Weatherstripped
CONSTRUCTION NO. 22 Concrete or Block Walls 8' high — 6½' below grade. Stray heat from boiler and piping included — OR — unheated crawl spaces.	**CONSTRUCTION NO. 23** 4" Concrete Slab with 1" Perimeter Insulation	

HEAT LOSS TABLE* (Continued on Page 4)

CALCULATED AT 70°F. DESIGN TEMPERATURE DIFFERENCE

Floor Area Sq. Ft.	CONSTRUCTION DESIGN										
	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7	No. 8	No. 9	No. 10	No. 11
500	28,750	23,900	27,350	22,510	18,075	16,860	17,910	16,160	15,460	15,110	15,360
600	32,300	27,030	30,620	25,350	20,520	19,200	20,460	18,360	17,520	17,100	17,490
700	35,860	30,150	33,900	28,190	22,970	21,540	23,010	20,560	19,580	19,090	19,610
800	39,840	33,590	37,600	31,350	25,640	24,080	25,760	22,960	21,840	21,280	21,920
900	43,340	36,680	40,820	34,160	28,050	26,380	28,270	25,120	23,860	23,230	24,010
1000	46,890	39,800	44,090	37,000	30,500	28,720	30,820	27,320	25,920	25,220	26,140
1100	50,450	42,920	47,370	39,840	32,940	31,060	33,370	29,520	27,980	27,210	28,270
1200	54,000	46,040	50,640	42,680	35,390	33,400	35,920	31,720	30,040	29,200	30,400
1300	56,640	48,470	53,000	44,830	37,340	35,300	38,030	33,480	31,660	30,750	32,120
1400	60,200	51,590	56,280	47,670	39,790	37,640	40,580	35,680	33,720	32,740	34,240
1500	62,830	54,030	58,630	49,830	41,740	39,540	42,690	37,440	35,340	34,290	35,970
1600	65,530	56,490	61,050	52,010	43,730	41,480	44,840	39,240	37,000	35,880	37,730
1700	68,590	59,250	63,830	54,490	45,910	43,570	47,140	41,190	38,810	37,620	39,630
1800	71,720	62,040	66,680	57,000	48,130	45,710	49,490	43,190	40,670	38,410	37,950
1900	73,930	64,150	68,600	58,830	49,860	47,410	51,400	44,750	42,090	40,760	43,120
2000	77,050	66,940	71,450	61,340	52,080	49,550	53,750	46,750	43,950	42,550	45,070
†	18%	21%	12%	14%	17%	18%	12%	14%	9%	6%	14%

* Based upon I-B-R calculations where ceiling height is 8 ft. and where total window and door areas do not exceed 20 percent of the GROSS wall area. For 9 ft. ceiling height add 11 percent to heat loss; for 10 ft. ceiling height, add 22 percent. For lower levels ONE HALF or LESS below grade level, use FIRST FLOOR heat loss.

† Deduct these percentages from FIRST FLOOR heat loss for two-story structures.

HEAT LOSS TABLE*

CALCULATED AT 70°F. DESIGN TEMPERATURE DIFFERENCE

Floor Area Sq. Ft.	CONSTRUCTION DESIGN											
	No. 12	No. 13	No. 14	No. 15	No. 16	No. 17	No. 18	No. 19	No. 20	No. 21	** No. 22	*** No. 23
500	14,660	14,310	30,360	25,520	28,960	24,120	32,780	27,940	31,380	26,540	5,130	4,350
600	16,650	16,230	34,060	28,790	32,380	27,105	36,690	31,420	35,010	29,740	6,150	4,725
700	18,630	18,140	37,760	32,050	35,780	30,090	40,600	34,890	38,650	32,930	7,180	5,220
800	20,800	20,240	41,920	35,670	39,680	33,430	45,040	38,790	42,800	36,550	8,210	5,600
900	22,750	22,120	45,560	38,910	43,040	36,390	48,890	42,240	46,370	39,720	9,230	5,980
1000	24,740	24,040	49,260	42,170	46,460	39,370	52,810	45,720	50,010	42,920	10,250	6,370
1100	26,730	25,960	52,960	45,430	49,880	42,350	56,720	49,190	53,640	46,110	11,300	6,750
1200	28,720	27,880	56,660	48,690	53,300	45,330	60,630	52,670	57,270	49,310	12,330	7,150
1300	30,300	29,390	59,360	51,200	55,720	47,560	63,450	55,290	59,810	51,650	13,340	7,330
1400	32,280	31,300	63,060	54,460	59,140	50,540	67,360	58,760	63,440	54,840	14,370	7,720
1500	33,870	32,820	65,770	56,970	61,570	52,770	70,180	61,380	65,980	57,180	15,400	7,920
1600	35,490	34,370	68,540	59,500	64,060	55,020	73,050	64,020	68,570	59,540	16,420	8,110
1700	37,250	36,060	71,710	62,370	66,950	57,610	76,390	67,050	71,630	62,290	17,440	8,400
1800	39,060	37,800	74,950	65,270	69,910	60,230	79,780	70,110	74,740	65,070	18,480	8,690
1900	40,460	39,130	77,190	67,410	71,870	62,090	82,080	72,304	76,760	66,990	19,500	9,270
2000	42,270	40,870	80,420	70,310	74,820	64,710	85,470	75,360	79,870	69,760	20,600	9,560
†	9%	6%	17%	20%	12%	13%	16%	18%	11%	12%	—	—

*Based upon I-B-R calculations where ceiling height is 8 ft. and where total window and door areas do not exceed 20 percent of the GROSS wall area. For 9 ft. ceiling height add 11 percent to heat loss; for 10 ft. ceiling height, add 22 percent. For lower levels ONE HALF or LESS below grade level, use FIRST FLOOR heat loss.

**Use for basement heat losses WITHOUT fully exposed walls and for floor losses over closed unheated crawl spaces. For basements with fully exposed walls, use FIRST FLOOR heat loss.

***Use for grade level slab construction.

†Deduct these percentages from first floor heat loss for two-story structures.

CORRECTION FACTORS

FOR OTHER THAN 70°F DESIGN TEMPERATURE DIFFERENCE

DESIGN TEMPERATURE DIFFERENCE	25°F	30°F	35°F	40°F	45°F	50°F	55°F	60°F	65°F
FACTOR	0.35	0.42	0.50	0.57	0.64	0.71	0.78	0.85	0.92

DESIGN TEMPERATURE DIFFERENCE	75°F	80°F	85°F	90°F	95°F	100°F	105°F	110°F	115°F
FACTOR	1.07	1.15	1.20	1.29	1.36	1.43	1.50	1.57	1.64

NOTE: Conversion Factor for "In Between" temperatures can be determined by interpolation between the closest tabulated values.

EXAMPLE: The outdoor design temperature in Cincinnati, Ohio is 1.° F. Indoor minus outdoor temperature equals 58°. F. Interpolated factor equals 0.82 (Rounded).

STEP 2. SELECT BOILER AND BASEBOARD

The *BOILER AND BASEBOARD SELECTION TABLE* below will provide for the selection of a gas or oil boiler (based upon I=B=R Net Ratings). This same table also provides for the selection of Weil-McLain convector baseboard and is based upon I=B=R Ratings using 200°F. average water temperatures (see note at bottom of page).

(a) Opposite NEAREST total heat loss, select gas or oil boiler:
Record Boiler Selection Here _____

(b) Follow line opposite NEAREST total heat loss to select total lineal feet of convector baseboard:
Record Convector Baseboard Selection Here: _____

(c) Follow line opposite NEAREST total heat loss to select total number of end caps or end boxes:
Record Number Here: _____

EXAMPLE:

Continuing with previous example and following the above instructions for *STEP 2*, select a gas-fired boiler, baseboard and end caps for the total heating load of 58,280 *BTUH* from *BOILER AND BASEBOARD SELECTION TABLE:*

(a) Opposite *NEAREST* total heat loss of 58,280 *BTUH*, select VHE-4 gas fired boiler.
Record Boiler Selection Here: VHE-4

(b) Follow line opposite *NEAREST* total heating load of 58,280 *BTUH* and select total lineal feet of 3/4" Therma Trim Baseboard:
Record Baseboard Selection Here: 85 Ft.

(c) Follow line opposite *NEAREST* total heating load of 58,280 *BTUH* and select total number of end caps:
Record Number Here: 16

BOILER AND BASEBOARD SELECTION TABLE

Heat Loss Total BTUH	WATER BOILER NO.				BASEBOARD Lineal Ft. Req'd. @ 200°F. Avg. Water Temperature (1 GPM Flow Rate)		Estimated End Caps or End Boxes		Heat Loss Total BTUH	WATER BOILER NO.				BASEBOARD Lineal Ft. Req'd. @ 200°F. Avg. Water Temperature (1 GPM Flow Rate)		Estimated End Caps or End Boxes	
	Gas			Oil	Therma Trim	High Trim	Therma Trim	High Trim		Gas			Oil	Therma Trim	High Trim	Therma Trim	High Trim
	VHE	HE	CGM	68						VHE	HE	CGM	68				
30,000	3	3	25	268	44	32	12	10	70,000	4	4	4	268	101	74	20	14
31,000	3	3	25	268	45	33	12	10	71,000	4	4	4	268	102	76	20	14
32,000	3	3	25	268	47	34	12	10	72,000	4	5	4	268	105	77	20	14
33,000	3	3	25	268	48	35	12	10	73,000	4	5	4	268	106	78	20	14
34,000	3	3	25	268	50	36	12	10	74,000	4	5	4	268	108	79	20	14
35,000	3	3	25	268	51	37	12	10	75,000	4	5	4	368	109	80	20	16
36,000	3	3	25	268	53	38	12	10	76,000	4	5	5	368	111	81	20	16
37,000	3	3	25	268	54	39	12	10	77,000	5	5	5	368	112	82	20	16
38,000	3	3	25	268	56	40	12	10	78,000	5	5	5	368	114	83	22	16
39,000	3	3	3	268	57	42	12	10	79,000	5	5	5	368	115	84	22	16
40,000	3	3	3	268	58	43	12	10	80,000	5	5	5	368	116	85	22	16
41,000	3	3	3	268	60	44	12	10	81,000	5	5	5	368	118	86	22	16
42,000	3	3	3	268	61	45	12	10	82,000	5	5	5	368	119	87	22	16
43,000	3	3	3	268	63	46	14	10	83,000	5	5	5	368	121	88	22	16
44,000	3	3	3	268	64	47	14	10	84,000	5	5	5	368	122	89	22	16
45,000	3	3	3	268	66	48	14	10	85,000	5	5	5	368	124	90	22	17
46,000	3	3	3	268	67	49	14	11	86,000	5	5	5	368	125	91	22	17
47,000	3	3	3	268	69	50	14	11	87,000	5	5	5	368	127	93	22	17
48,000	3	3	3	268	70	51	14	11	88,000	5	5	5	368	128	94	22	17
49,000	3	4	3	268	72	52	14	11	89,000	5	5	5	368	129	95	22	17
50,000	3	4	3	268	73	53	14	11	90,000	5	5	5	368	131	96	22	17
51,000	3	4	4	268	74	54	16	11	91,000	5	5	5	368	132	97	22	17
52,000	4	4	4	268	76	55	16	11	92,000	5	5	5	368	134	98	22	17
53,000	4	4	4	268	77	56	16	11	93,000	5	5	5	368	135	99	22	17
54,000	4	4	4	268	79	57	16	11	94,000	5	5	5	368	137	100	22	17
55,000	4	4	4	268	80	59	16	13	95,000	5	5	5	368	138	101	22	17
56,000	4	4	4	268	82	60	16	13	96,000	5	6	5	368	140	102	22	17
57,000	4	4	4	268	83	61	16	13	97,000	5	6	5	368	141	103	24	17
58,000	4	4	4	268	85	62	16	13	98,000	5	6	5	368	143	104	24	17
59,000	4	4	4	268	86	63	16	13	99,000	5	6	5	368	144	105	24	17
60,000	4	4	4	268	87	64	18	13	100,000	5	6	5	468	145	106	24	17
61,000	4	4	4	268	89	65	18	13	101,000	5	6	6	468	147	107	24	17
62,000	4	4	4	268	90	66	18	13	102,000	5	6	6	468	148	109	24	17
63,000	4	4	4	268	92	67	18	13	103,000	6	6	6	468	150	110	24	17
64,000	4	4	4	268	93	68	18	13	104,000	6	6	6	468	151	111	24	17
65,000	4	4	4	268	95	69	18	14	105,000	6	6	6	468	152	112	24	19
66,000	4	4	4	268	96	70	18	14	106,000	6	6	6	468	154	113	24	19
67,000	4	4	4	268	98	71	18	14	107,000	6	6	6	468	156	114	24	19
68,000	4	4	4	268	99	72	18	14	108,000	6	6	6	468	157	115	24	19
69,000	4	4	4	268	100	73	18	14	109,000	6	6	6	468	158	116	24	19
									110,000	6	6	6	468	160	117	24	19

For number of lineal feet of baseboard required at other average water temperatures multiply lineal feet required for 200°F., Average Water Temperature by factors shown at right.

Average Water Temperature	Multiplier
180°F.	1.22
190°F.	1.10
210°F.	0.92

Note: When total heat loss exceeds 110,000 BTUH, consult rating tables in Weil-McLain product literature.

STEP 3. DETERMINE CIRCUIT AND TRUNK PIPE SIZING

The Pipe Sizing Table on Page 7 is based upon "standard" type circulators with a maximum of a 20°F. temperature drop.

All circuits are designed for use with 1/2" or 3/4" piping in single or multiple series loop circuits. Where total heat loss found in *STEP 1* exceeds the capacity of one 3/4" loop circuit, two or more loop circuits must be used and supplied from a 3/4", 1" or 1-1/4" trunk main which has a capacity equal to or exceeding the total heat loss.

(a) Determine total measured length of entire SINGLE circuit or total measured length of circuit No. 1, including the convector baseboard; determine the heating load of circuit No. 1; determine the pipe size of the circuit and record all data here. Repeat for additional circuits when required.

Length of circuit No. 1	= _____	feet	Length of circuit No. 3	= _____	feet
BTUH load of circuit No. 1	= _____	BTUH	BTUH load of circuit No. 3	= _____	BTUH
Size of circuit piping	= _____	*	Size of circuit piping	= _____	*
Length of circuit No. 2	= _____	feet	Length of circuit No. 4	= _____	feet
BTUH load of circuit No. 2	= _____	BTUH	BTUH load of circuit No. 4	= _____	BTUH
Size of circuit piping	= _____	*	Size of circuit piping	= _____	*

(b) Determine the total length of the longest Circuit noted above, determine the total heating load handled by the TRUNK main, determine the pipe size of the trunk main and record all data here:

Length of LONGEST circuit	= _____	feet
BTUH load of trunk main	= _____	BTUH
Size of trunk main piping	= _____	

***Do not exceed 3/4" pipe for individual circuits.**

Example:

Using the previous example of a 26' x 50' house with a total heating load of 58,280 BTU, it can be assumed that a single loop circuit measured length will be at least 26' + 26' + 50' + 50' + 10' = 162' (See piping layout). Opposite 58,000 BTUH in the Pipe Sizing Table, it is shown that 1" pipe is needed. Since loops are limited to 3/4" piping because of the 3/4" baseboard tube size, the system must be laid out in at least two loops.

In this example there will be three loops, as you will recall from *STEP 1* that the owner wanted three zones — two on the first floor and one in the basement.

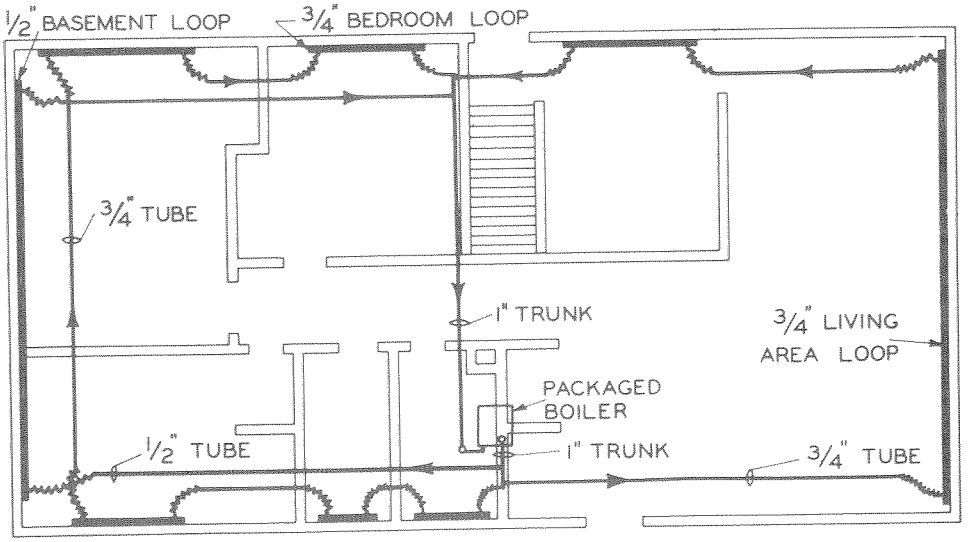
When estimating the pipe sizes for the first floor loops, it is necessary to determine the heating load carried by each loop. Since the living area usually carries the greater load because of larger glass areas, we will assume that the living area loop will carry a load of 24,000 BTUH and the sleeping area loop a load of 18,940 BTUH. Assume also that the measured length of each floor loop is 26' + 26' + 25' + 25' + 10' = 112'.

Opposite 24,000 BTUH in the Pipe Sizing Table it is shown that a 3/4" loop up to 268' will be adequate. Opposite 19,000 BTUH it is found that 1/2" pipe will be adequate for only up to 109' measured loop length and is therefore not large enough for this example. Hence, each first floor loop must be 3/4" piping.

The basement heating load is 15,340 BTUH. Assuming that the entire basement load is on a single circuit of 112' measured length (see piping layout) it is shown in the Pipe Sizing Table that 1/2" pipe will handle this load for up to 160'. The baseboard elements in the basement will still be 3/4", but all basement loop piping can be 1/2" copper tubing.

The pipe size of the supply and return trunk main is determined from the total heating load of 58,280 BTUH and from the longest loop length which is 112'. Entering the Pipe Sizing Table at 58,000 BTUH, it is shown that a 1" pipe will handle the load up to a measured loop length of 187'. The trunk main will therefore be a 1" pipe or tube.

LAYOUT OF EXAMPLE HOUSE



PIPE SIZING TABLE

Maximum *measured length* of loop and trunk, including baseboard. Pump head 7.5 ft.--20° temperature drop.

Trunk or Circuit Load BTUH	Piping Dimensions								Trunk Load BTUH	Piping Dimensions			
	Size	Length	Size	Length	Size	Length	Size	Length		Size	Length	Size	Length
5,000	½″	1,120							67,000	1″	146	1¼″	535
6,000	½″	900							68,000	1″	143	1¼″	523
7,000	½″	710							69,000	1″	140	1¼″	511
8,000	½″	555							70,000	1″	137	1¼″	498
9,000	½″	444							71,000	1″	132	1¼″	486
10,000	½″	354							72,000	1″	128	1¼″	473
11,000	½″	300							73,000	1″	125	1¼″	461
12,000	½″	260							74,000	1″	121	1¼″	449
13,000	½″	218	¾″	930					75,000	1″	119	1¼″	439
14,000	½″	182	¾″	830					76,000	1″	115	1¼″	430
15,000	½″	160	¾″	725					77,000	1″	112	1¼″	421
16,000	½″	140	¾″	620					78,000	1″	109	1¼″	411
17,000	½″	125	¾″	545					79,000	1″	107	1¼″	401
18,000	½″	112	¾″	465					80,000	1″	105	1¼″	392
19,000	½″	109	¾″	420					81,000	1″	102	1¼″	383
20,000	½″	93	¾″	372					82,000	1″	100	1¼″	373
21,000	½″	86	¾″	342					83,000	1″	98	1¼″	366
22,000	½″	80	¾″	310					84,000	1″	95	1¼″	358
23,000			¾″	290					85,000	1″	93	1¼″	351
24,000			¾″	268					86,000	1″	92	1¼″	343
25,000			¾″	250					87,000	1″	91	1¼″	336
26,000			¾″	233					88,000	1″	89	1¼″	328
27,000			¾″	220					89,000	1″	87	1¼″	321
28,000			¾″	208					90,000	1″	86	1¼″	314
29,000			¾″	187					91,000	1″	84	1¼″	307
30,000			¾″	178	1″	630			92,000	1″	82	1¼″	300
31,000			¾″	169	1″	606			93,000	1″	80	1¼″	293
32,000			¾″	156	1″	560			94,000			1¼″	287
33,000			¾″	150	1″	525			95,000			1¼″	280
34,000			¾″	143	1″	504			96,000			1¼″	275
35,000			¾″	139	1″	476			97,000			1¼″	271
36,000			¾″	133	1″	450			98,000			1¼″	267
37,000			¾″	125	1″	430			99,000			1¼″	263
38,000			¾″	117	1″	410			100,000			1¼″	258
39,000			¾″	113	1″	390			101,000			1¼″	254
40,000			¾″	110	1″	373			102,000			1¼″	249
41,000			¾″	103	1″	360			103,000			1¼″	246
42,000			¾″	99	1″	347			104,000			1¼″	242
43,000			¾″	96	1″	334			105,000			1¼″	239
44,000			¾″	93	1″	320			106,000			1¼″	235
45,000					1″	307			107,000			1¼″	231
46,000					1″	293			108,000			1¼″	228
47,000					1″	280			109,000			1¼″	224
48,000					1″	270			110,000			1¼″	219
49,000					1″	259			111,000			1¼″	214
50,000					1″	250			112,000			1¼″	209
51,000					1″	240			113,000			1¼″	204
52,000					1″	232			114,000			1¼″	201
53,000					1″	224			115,000			1¼″	197
54,000					1″	217			116,000			1¼″	193
55,000					1″	210			117,000			1¼″	190
56,000					1″	204			118,000			1¼″	187
57,000					1″	195			119,000			1¼″	185
58,000					1″	187			120,000			1¼″	183
59,000					1″	184			121,000			1¼″	181
60,000					1″	177	1¼″	653	122,000			1¼″	179
61,000					1″	173	1¼″	635	123,000			1¼″	177
62,000					1″	166	1¼″	616	124,000			1¼″	175
63,000					1″	160	1¼″	597	125,000			1¼″	173
64,000					1″	157	1¼″	579	126,000			1¼″	172
65,000					1″	153	1¼″	560	127,000			1¼″	170
66,000					1″	149	1¼″	547	128,000			1¼″	168

STEP 4. ESTIMATE THE PRICE

Page 8 of this booklet lists the material required for a residential heating system. Boiler, baseboard and trim pieces can be priced from our current price sheet. The price of pipe, fittings, etc., can be quickly estimated from past experience, using this page as a check list.

When an I = B = R heat loss has been calculated, the contractor can complete the page in order to determine the exact price of the job.

MATERIAL LIST

QTY.	ITEM	AMOUNT	QTY.	ITEM	AMOUNT
	Boiler Model No.			Sub-Total Brought Forward	
	DOE Efficiency Rating			Standard Splice Set	
	Thermostats			14" Splice Set	
	Zone Valves			Element Bracket	
	Balancing Valves			Element Glide	
	Air Cushion Tank			Return Tube Hanger	
	Flow Control Valve			Supply Tube Hanger	
	Low Limit or Reverse Acting Control				
	Pressure Reducing Valve				
	Smoke Pipe				
	Extra Valves			Return Bend Fitting	
	Gas Piping			Floor Grommet	
	Oil Tank, Pipe and Fittings			Flexible Riser Connector	
	Pipe			(with) (without) coupling	
	Fuel Valves			Flexible Corner Connector	
	Circulators			Expansion Joint	
	Relay				
	Circuit Breaker (or fuse) Panel				
	240v. Disconnect Switch				
	240v. 3-Wire Service Cable				
	Copper Pipe: 1/2"				
	3/4"				
	1"				
	Fittings				
	Lineal Feet of Baseboard				
	Baseboard Accessories:				
	End Cap R.H.			Electric Wiring	
	End Cap L.H.			Freight and Cartage	
	End Box R.H.			Incidentals	
	End Box L.H.				
	Valve Box R.H.			TOTAL COST OF MATERIAL	
	Valve Box L.H.			Labor	
	Inside Corner (With Filler)			Profit	
	Outside Corner			Overhead	
	Inside Bay Corner (With Filler)				
	SUB-TOTAL			Bid Price	

STEP 5. MAKE I=B=R CALCULATION

Once a job has been sold a complete I = B = R calculation should be made to accurately locate baseboard panels in each room. Refer to I = B = R heat loss calculation guide.

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OTHER MATERIALS AVAILABLE TO AID IN HEAT LOSS CALCULATIONS

- Easy-Loop Worksheet—Form No. C-566—to be used in conjunction with your Easy-Loop Booklet.
- "Modern Method" Heat Loss Calculation Sheet—Form No. MC-1407.
- "Detailed Method" I = B = R Heat Loss Calculation Sheet—Form No. MC-1956.

Contact Your Local Weil-McLain Distributor or Field Representative or write to: Advertising Dept., Weil-McLain, Blaine St., Michigan City, IN 46360