

 **AMERICAN
STANDARD**

technical catalog bulletin

MODEL R

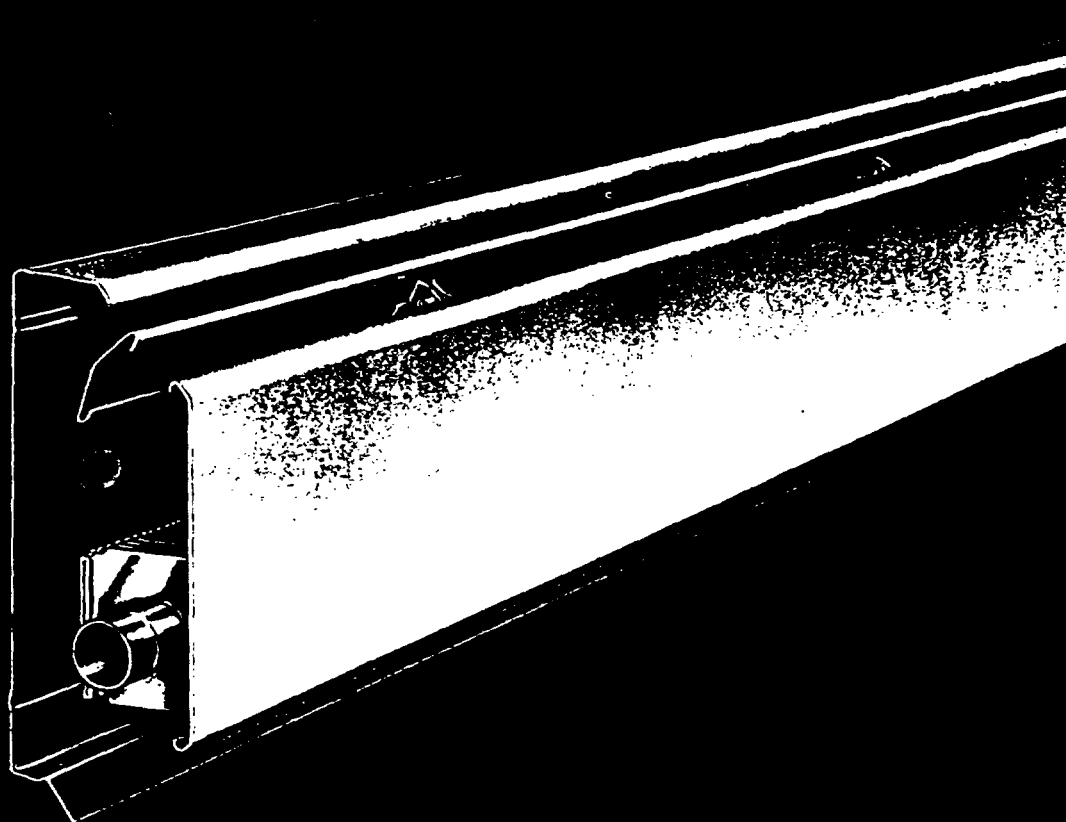
Heatrin

non-ferrous residential baseboard

hot water

PLAINTIFF'S EXHIBIT

ASI-1074



03961

Model R Heatrim baseboard panels—stylish modern comfort that's easy to install

Symmetrically styled for modern, low-silhouette appearance...designed for fast, low-cost installation...and engineered for peak hydronic performance...that's Model R Heatrim, a residential baseboard from American-Standard. Compact Model R Heatrim stands only $7\frac{3}{4}$ " high and extends only $2\frac{1}{4}$ " into the room when set flush against the wall, and even less when recessed to plaster depth. Homeowners like the simple, uncluttered look of Model R Heatrim panels...and the decorating freedom provided by the white semi-gloss prime coat, which may be left as is or repainted later (with any good quality alkylid base paint) to match room decor. Installers like the convenience of working with this baseboard. The back panel stands unaided against the

wall so that all back panels, filler and joining pieces can be positioned and fastened to the wall by one man. Brackets, dampers, front panels and accessories snap right on. No tools needed. No time wasted. Two high-capacity heating elements are available for installation flexibility. And Model R Heatrim is packaged to meet any need. It's shipped in completely-assembled, bulk or individual packages in 3, 4, 5, 6, 7, and 8-foot lengths. Also available is a 2-foot completely-assembled unit, plus 10 and 12-foot enclosures (either bulk-packaged or assembled). All enclosures are shipped in convenient "pull-tape" packages for easy opening. No matter what the requirements, Model R Heatrim does the job with efficiency, economy and style.

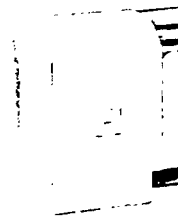
Model R Heatrim "snap-on" accessories



combination end cap and wall-end piece

A one-piece accessory, 3 inches wide, with appropriate knockout to allow it to double as a wall-end piece: slips in over top of back panel and snaps firmly to bottom of front panel; adjustable end provides clearance for piping connections.

ordering numbers:
RA-ECL-03 (left hand)
RA-ECR-03 (right hand)



valve enclosure

A one-piece accessory, available in widths of 4 and 6 inches; slides behind enclosure back panel and snaps securely into place at bottom of enclosure front panel; telescopes for adjustable end clearance.

ordering numbers:

RA-VEL-04 (left hand, 4-in. width)
RA-VER-04 (right hand, 4-in. width)
RA-VEL-06 (left hand, 6-in. width)
RA-VER-06 (right hand, 6-in. width)

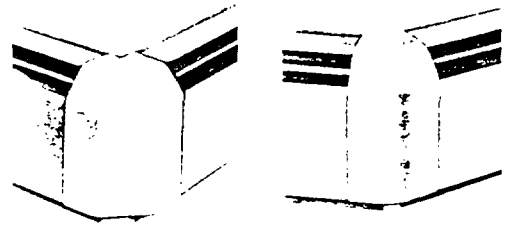


inside corners

Two inside corners are available: a 90° hinged corner and a 135°-45° plain corner for use under bay windows.

ordering numbers:

RA-ICF-90 (90° corner, hinged front and top sections)
RA-ICB-90 (90° corner, back section)
RA-ICF-45 (135°-45° corner, front and top sections)
RA-ICB-45 (135°-45° corner, back section)

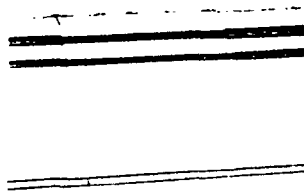


outside corners

Two outside corners are available: a 90° corner and a 135°-45° corner for use under bay windows.

ordering numbers:

RA-OCF-90 (one-piece 90° outside corner)
RA-OCF-45 (one-piece 135°-45° outside corner)

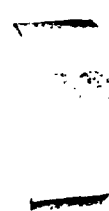


filler piece sets

Consist of front piece, back piece, and damper piece, available in 7" and 14" widths.

ordering numbers:

RA-FPS-07 (7" set)
RA-FPS-14 (14" set)



3" wall end piece

A one-piece accessory that can be used at either end of an enclosure panel; hooks in over top of back panel and snaps firmly to bottom of front panel; extends to wall surface.

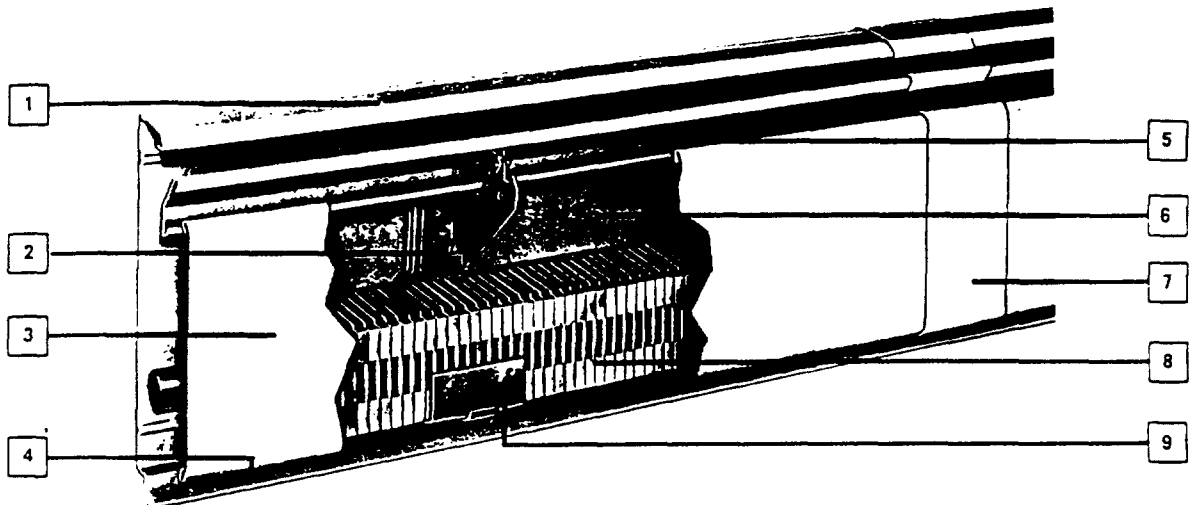
ordering number:
RA-WEP-03

NOTE: On free-standing installation, all end accessories can be attached after the enclosure is fastened to the wall and the element soldered. On recessed installations, all accessories must be attached to back panel before mounting in recess.

All accessories are packed 10 per box, except 14" filler piece sets (RA-FPS-14) which are packed 5 per box.

model R Heatrim

non-ferrous residential baseboard



1—enclosure top and back panel—is of one-piece steel construction for strength and durability. Smooth surface won't collect dust and lint. Lower portion is extended $\frac{3}{4}$ " out from wall to cover any openings between wall and finished flooring and to let panel stand unaided while being fastened to wall.

2—snap-in brackets—are die-formed of one-piece heavy gauge steel to support front panel and element where required; can be located at any point along back panel.

3—enclosure front panel—is of flat, dent-resisting steel; firmly snaps onto brackets either way (there is no top or bottom edge) and is easily removed for cleaning when necessary.

4—air intake space—allows unrestricted circulation of air for maximum heating efficiency and permits easy cleaning underneath element.

5—pivot-mounted damper—allows positive fingertip control for easy opening and closing from any point along its length; can be set in any position to regulate heat flow. Damper is standard equipment... no extra charge.

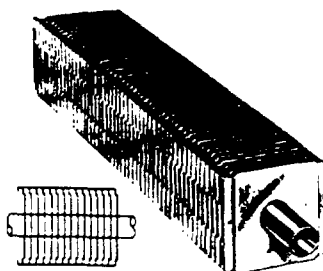
6—enclosure interior—gray prime coat provides background so that brackets and element blend in.

7—joining piece set—consists of front piece, back piece and damper piece, each two inches wide to neatly cover joints; included as standard equipment.

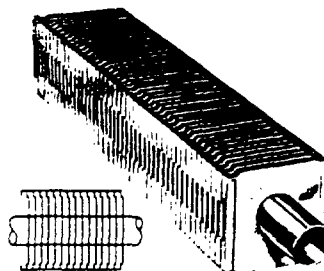
8—heating elements—two high-output elements are available, each with heat-reflecting interlocked aluminum fins (vented for maximum performance) bonded to seamless copper tubing for quick response, high I=B=R approved ratings.

9—element slide cradle—of lead-coated metal (terneplate) for lubricant slickness; snaps onto element and rides in bracket for noiseless linear movement of element.

two high-capacity elements

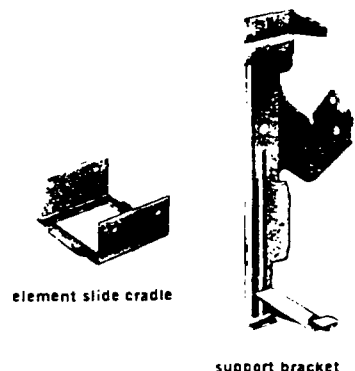


E-500 ($\frac{1}{2}$ -in. nominal copper tubing)



E-750 ($\frac{3}{4}$ -in. nominal copper tubing)

Interlocked box-fins... $2\frac{1}{4}$ inches square... tubes have one end expanded for easy coupling with unexpanded end of next element.



element slide cradle

support bracket

03963

1	510	570	630	690	750	810	540	600	670	730	790	850
2	1020	1140	1260	1380	1500	1620	1080	1200	1340	1460	1580	1700
3	1530	1710	1890	2070	2250	2430	1620	1800	2010	2190	2370	2550
4	2040	2280	2520	2760	3000	3240	2160	2400	2680	2920	3160	3400
5	2550	2850	3150	3450	3750	4050	2700	3000	3350	3650	3950	4300
6	3060	3420	3780	4140	4500	4860	3240	3600	4020	4380	4740	5160
7	3570	3990	4410	4830	5250	5670	3780	4200	4690	5110	5530	5950
8	4080	4560	5040	5520	6000	6480	4320	4800	5360	5840	6320	6800
9	4590	5130	5670	6210	6750	7290	4860	5400	6030	6570	7110	7650
10	5100	5700	6300	6900	7500	8100	5400	6000	6700	7300	7900	8500
11	5610	6270	6930	7590	8250	8910	5940	6600	7370	8030	8690	9350
12	6120	6840	7560	8280	9000	9720	6480	7200	8040	8760	9480	10200
13	6630	7410	8190	8970	9750	10530	7020	7800	8710	9490	10270	11050
14	7140	7980	8820	9660	10500	11340	7560	8400	9380	10220	11060	11900
15	7650	8550	9450	10350	11250	12150	8100	9000	10050	10950	11850	12750
16	8160	9120	10080	11040	12000	12960	8640	9600	10720	11680	12640	13600
17	8670	9690	10710	11730	12750	13770	9180	10200	11390	12410	13430	14450
18	9180	10260	11340	12420	13500	14580	9720	10800	12060	13140	14220	15300
19	9690	10830	11970	13110	14250	15390	10260	11400	12730	13870	15010	16150
20	10200	11400	12600	13800	15000	16200	10800	12000	13400	14600	15800	17000
21	10710	11970	13230	14490	15750	17010	11340	12600	14070	15330	16590	17850
22	11220	12540	13860	15180	16500	17820	11880	13200	14740	16060	17380	18700
23	11730	13110	14490	15870	17250	18630	12420	13800	15410	16730	18170	19500
24	12240	13680	15120	16560	18000	19440	12960	14400	16080	17520	18960	20400
25	12750	14250	15750	17250	18750	20250	13500	15000	16750	18250	19750	21250
26	13260	14820	16380	17940	19500	21060	14040	15600	17420	18980	20540	22100
27	13770	15390	17010	18630	20250	21870	14580	16200	18090	19710	21330	22950
28	14280	15960	17640	19320	21000	22680	15120	16800	18760	20440	22120	23800
29	14790	16530	18270	20010	21750	23490	15660	17400	19430	21170	22910	24650
30	15300	17100	18900	20700	22500	24300	16200	18000	20100	21900	23700	25500

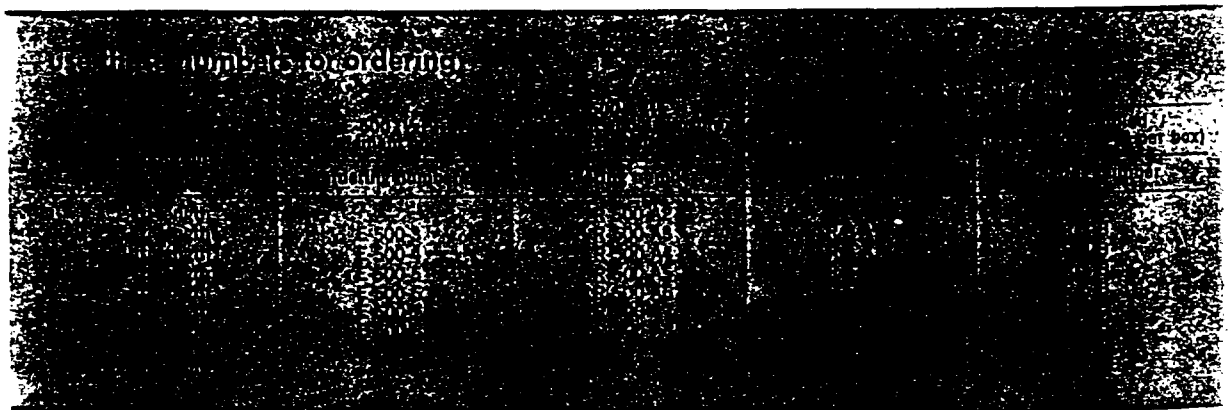
■ Approved I=B=R water ratings shown above for American-Standard Heatrim Panels (with Model E-500 elements) are based on a water flow of 500 pounds per hour with a pressure drop of 1.250 inches of water per linear foot and a water flow rate of 2000 pounds per hour with a pressure drop of 2.900 inches of water per linear foot. As allowed by the Institute of Boiler and Radiator Manufacturers (I=B=R) Testing and Rating Code for Baseboard Type of Radiation, 15% is added to water heat capacity.

The use of I=B=R ratings at water flow rates of 2000 pounds per hour is limited to installation where the water flow rate through the base-

board unit is equal to or greater than 2000 pounds per hour. Where the water flow rate through the baseboard is not known, the I=B=R rating at the standard water flow of 500 pounds per hour must be used.

● These ratings are based on active (finned) heatrim lengths. 2 feet space between active length and total length of the standard heatrim heating elements is 2 1/4 inches. Elements are unpainted.

Non-ferrous fins on Model E-500 elements measure 2 1/4 x 2 1/4 x 0.010 inches, spaced 52 fins per foot.



model R Heatrin

non-ferrous residential baseboard

1	490	550	610	680	740	800	520	580	640	720	780	850
2	980	1100	1220	1360	1480	1600	1040	1160	1280	1440	1560	1700
3	1470	1650	1830	2040	2220	2400	1560	1740	1920	2160	2340	2550
4	1960	2200	2440	2720	2960	3200	2080	2320	2560	2880	3120	3400
5	2450	2750	3050	3400	3700	4000	2600	2900	3200	3600	3900	4250
6	2940	3300	3660	4080	4440	4800	3120	3480	3840	4320	4680	5100
7	3430	3850	4270	4760	5180	5600	3640	4060	4480	5040	5460	5950
8	3920	4400	4880	5440	5920	6400	4160	4640	5120	5760	6240	6800
9	4410	4950	5490	6120	6660	7200	4680	5220	5760	6480	7020	7650
10	4900	5500	6100	6800	7400	8000	5200	5800	6400	7200	7800	8500
11	5390	6050	6710	7480	8140	8800	5720	6380	7040	7920	8580	9350
12	5880	6600	7320	8160	8880	9600	6240	6960	7680	8640	9360	10200
13	6370	7150	7930	8840	9520	10400	6760	7540	8320	9360	10140	11050
14	6860	7700	8540	9520	10360	11200	7280	8120	8960	10080	10920	11900
15	7350	8250	9150	10200	11100	12000	7800	8700	9600	10800	11700	12750
16	7840	8800	9760	10880	11840	12800	8320	9280	10240	11520	12480	13600
17	8330	9350	10370	11560	12580	13600	8840	9860	10880	12240	13260	14450
18	8820	9900	10980	12240	13320	14400	9360	10440	11520	12960	14040	15300
19	9310	10450	11590	12920	14060	15200	9880	11020	12160	13680	14820	16150
20	9800	11000	12200	13600	14800	16000	10400	11600	12800	14400	15600	17000
21	10290	11550	12810	14280	15540	16800	10920	12180	13440	15120	16380	17850
22	10780	12100	13420	14960	16280	17600	11440	12760	14080	15840	17160	18700
23	11270	12650	14030	15640	17020	18400	11960	13340	14720	16560	17940	19550
24	11760	13200	14640	16320	17760	19200	12480	13920	15360	17280	18720	20400
25	12250	13750	15250	17000	18500	20000	13000	14500	16000	18000	19500	21250
26	12740	14300	15860	17680	19240	20800	13520	15080	16640	18720	20280	22100
27	13230	14850	16470	18360	19980	21600	14040	15660	17280	19440	21060	22950
28	13720	15400	17080	19040	20720	22400	14560	16240	17920	20160	21840	23800
29	14210	15950	17690	19720	21460	23200	15080	16820	18560	20880	22620	24650
30	14700	16500	18300	20400	22200	24000	15600	17400	19200	21600	23400	25500

■ Approved I=B=R water ratings shown above for American-Standard Heatrin Panels (with Model E-750 element) are based on a water flow of 500 pounds per hour with a pressure drop of 0.047 inches of water per linear foot and a water flow of 2000 pounds per hour with a pressure drop of 0.530 inches of water per linear foot. As allowed by the Institute of Boiler and Radiator Manufacturers (I=B=R) Testing and Rating Code for Baseboard Type of Radiation 15% is added to water heat capacity.

The use of I=B=R ratings at water flow rates of 2000 pounds per hour is limited to installation where the water flow rate through the base-

board unit is equal to or greater than 2000 pounds per hour. Where the water flow rate through the baseboard is not known, the I=B=R rating at the standard water flow rate of 500 pounds per hour must be used.

● These ratings are based on active (finned) Heatrin lengths. Difference between active length and total length of the standard Heatrin heating elements is 2 1/4 inches. Elements are unpainted.

Non-ferrous fins on Model E-750 elements measure 2 1/4 x 2 1/4 x 0.008 inches, spaced 52 fins per foot.

use these numbers for ordering

Model R-750 (1/2")		Model R-750 (3/4")		Model R-750 (1")	
Element only		Element and panel		Element and panel	
Ordering number		Ordering number		Ordering number	
1	490	1	490	1	490
2	980	2	980	2	980
3	1470	3	1470	3	1470
4	1960	4	1960	4	1960
5	2450	5	2450	5	2450
6	2940	6	2940	6	2940
7	3430	7	3430	7	3430
8	3920	8	3920	8	3920
9	4410	9	4410	9	4410
10	4900	10	4900	10	4900
11	5390	11	5390	11	5390
12	5880	12	5880	12	5880
13	6370	13	6370	13	6370
14	6860	14	6860	14	6860
15	7350	15	7350	15	7350
16	7840	16	7840	16	7840
17	8330	17	8330	17	8330
18	8820	18	8820	18	8820
19	9310	19	9310	19	9310
20	9800	20	9800	20	9800
21	10290	21	10290	21	10290
22	10780	22	10780	22	10780
23	11270	23	11270	23	11270
24	11760	24	11760	24	11760
25	12250	25	12250	25	12250
26	12740	26	12740	26	12740
27	13230	27	13230	27	13230
28	13720	28	13720	28	13720
29	14210	29	14210	29	14210
30	14700	30	14700	30	14700

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Installation Notes



Installation Notes

return tubing hanger

return tubing hanger
for both 1/2" and 3/4"



return tubing hanger

connecting tubing hanger
(for 1/2 inch or 3/4 inch diameter)



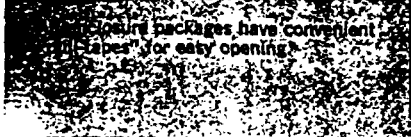
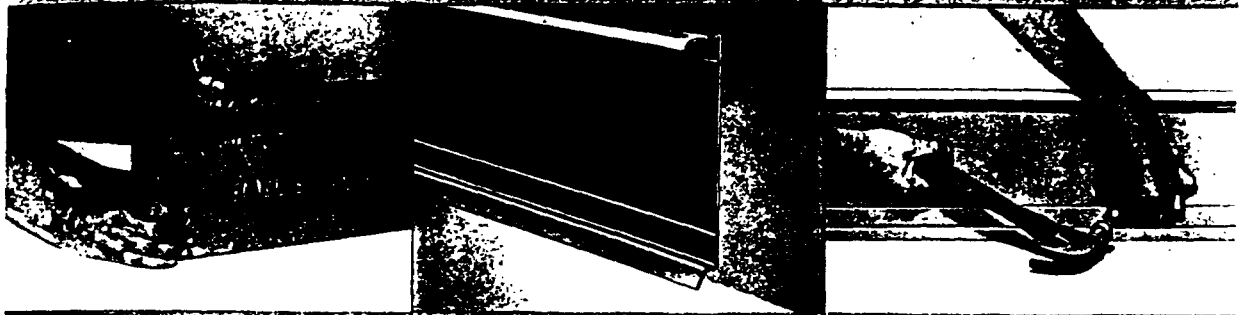
connecting tubing hanger
for 1/2 inch or 3/4 inch

connecting tubing hanger

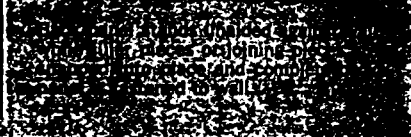
model R Heatrim

non-ferrous residential baseboard

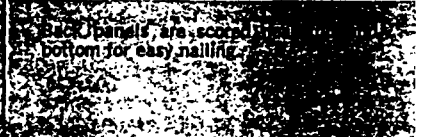
Model R Heatrim makes baseboard installation quicker, easier and neater than ever before possible.



Heatrim packages have convenient "finger" for easy opening.



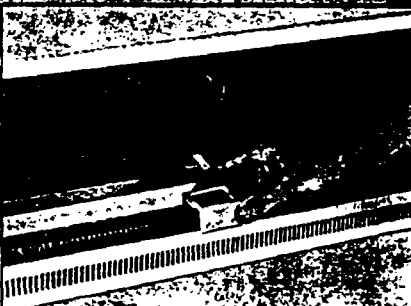
Heatrim panels are scored from bottom for easy nailing.



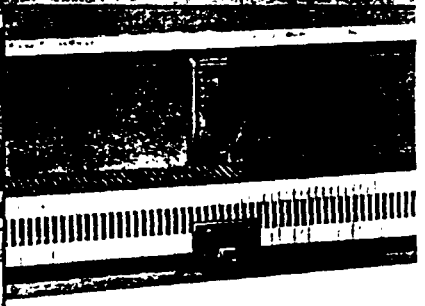
Heatrim panels are scored from bottom for easy nailing.



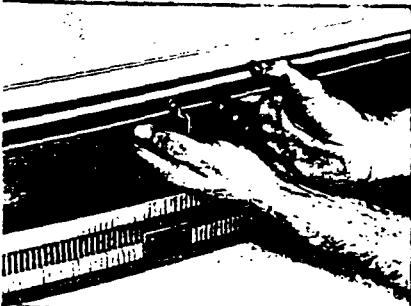
Movable brackets snap quickly into place on back panel.



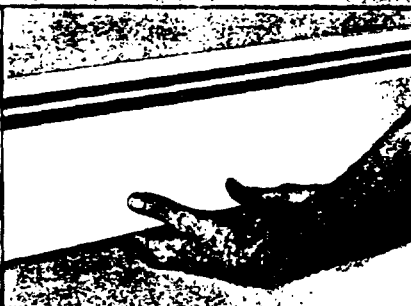
"Noiseless" metal slide cradle snaps onto element at point where element will rest in bracket.



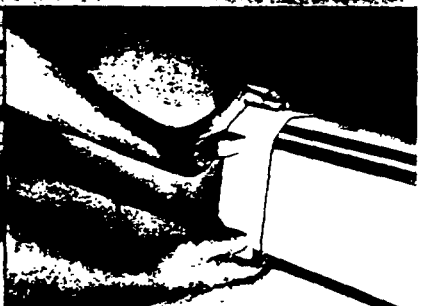
Element is supported by bottom arm of bracket; lubricant slickness of slide cradle allows noiseless linear movement of element in bracket.



With clamp ends of clips toward front of unit, damper snaps onto bracket for easy fingertip adjustment from any point along its length.



Front panel snaps firmly onto bracket at top and bottom.



Accessories snap on easily for neat, finished appearance.

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 AMERICAN STANDARD

model R Heatrim

non-ferrous residential baseboard

system data and design

Mainless installation, in which Model R Heatrim panels serve as part of the main, is the most economical system in which these panels can be used. This installation results in substantial savings in labor and material in that valves and additional piping are eliminated. The Comfort Engineered Design Procedure has been developed by American-Standard especially for mainless systems to provide a quality installation at low cost.

1. Calculate the heat loss of each room, using a recognized formula such as outlined in the I=B=R Heat Loss Calculation Guide or the ASHRAE Guide.
2. Lay out the design of the system, using a recommended guide such as the American-Standard Comfort Engineered Design Procedure, the I=B=R Installation Guide, or ASHRAE Guide.
3. Select the proper length of Model R Heatrim using the tables on pages 4 and 5; or the Comfort Engineered Design Slide Rule.
4. To complete the installation, install Model R Heatrim enclosures wall to wall to cover the bare pipe.

Tabulated ratings show heat emission expressed in Btu/hr per lineal foot of Model R Heatrim for average water temperatures ranging from 220° to 170°F, and for average water flow rates of 500 pounds per hour and 2000 pounds per hour. Since heat loss calculation is expressed in Btu/hr, selection of Model R Heatrim can be made right from these tables. The elements themselves serve as part of the main. Where structural arrangements such as doorways occupy part of the wall, the piping goes down under the floor and comes back up at the exact spot necessary for connection to the next element. End caps or valve enclosures are used for finished appearance at these points.

• circulators

A standard circulator (7-8 foot head) will meet most requirements for mainless residential installations. The chart below lists maximum load-length combinations for series loops, using a standard circulator (7-8 foot head) and a 20°F. temperature drop.

tube size (inches)	output (Btu/hr)	length of run (feet)
1/4	35,000	120
	30,000	150
	25,000	210
1/2	17,000	125
	15,000	175
	13,000	200

Oversized pumps (pumps with too high a head for the system) may cause noise in a system as a result of high water velocity, or cause cavitation resulting from the high head and the improper placement of the pump in the system. The I=B=R Installation Guide or ASHRAE Guide will aid in the proper selection of a circulator.

• near boiler piping and air vents

1. Original Fill—recommended near boiler piping and procedure for filling system is shown in the appropriate Technical Catalog Bulletin

and Installation and Maintenance Manual for the American-Standard boiler to be used.

2. System Operation—air and gas liberated on heating the water in the boiler must be prevented from circulating through the system. Many American-Standard boilers have a built-in air-eliminating device. Other boilers must be piped with an external air-eliminating device. When Model R Heatrim units are used with mains and risers in either one-pipe or two-pipe systems, each section or panel should be vented at the return connection. A sweat elbow with a 1/8-inch vent connection is available for this application.

Drains should be provided when necessary.

expansion

Provision must be made to prevent distortion or noise due to expansion. A straight run of Model R Heatrim, when not restricted, tends to give an equal expansion at each end, with the center remaining stationary. If one end is restricted, the expansion is cumulative along the entire length with the total amount of the expansion being evident at the free end. If both ends are confined, the element bows up in an arc to accommodate the increased length.

The following table lists the maximum lengths which can be installed if both ends are free to expand when the water temperature is raised from 70°F. to the average water temperature shown:

average water temperature °F.	maximum length of straight run (feet)
220	26
210	28
200	30
190	33
180	35
170	39
160	42
150	47

It is good design practice to allow for expansion drops in tubing expansion joints or other provisions. Where one expansion joint is employed, the joint should be installed in the middle of the run. Where two expansion joints are employed, the joints should be installed at points 1/3 of the length of the run from each end. Where piping drops below floor level, the vertical risers should be at least 12 inches long and offset in floor holes in line with those listed in the following table:

Heatrim element	tube size		recommended minimum hole (inches)
	nominal (inches)	O.D. (inches)	
E-500	1/2	5/8	1
E-750	3/4	7/8	1 1/4

wall-to-wall carpeting

Wall-to-wall carpeting, provided it does not exceed 1/4 inch in thickness, may be used with Model R Heatrim without special construction. For thickness greater than 1/4 inch (including both carpet and underpadding), each back panel should be set on a strip of wood having a thickness equal to the carpet and pad. This method will assure full efficiency from the Model R Heatrim and provide neat, attractive installation.

 **AMERICAN
STANDARD**
PLUMBING / HEATING

03968