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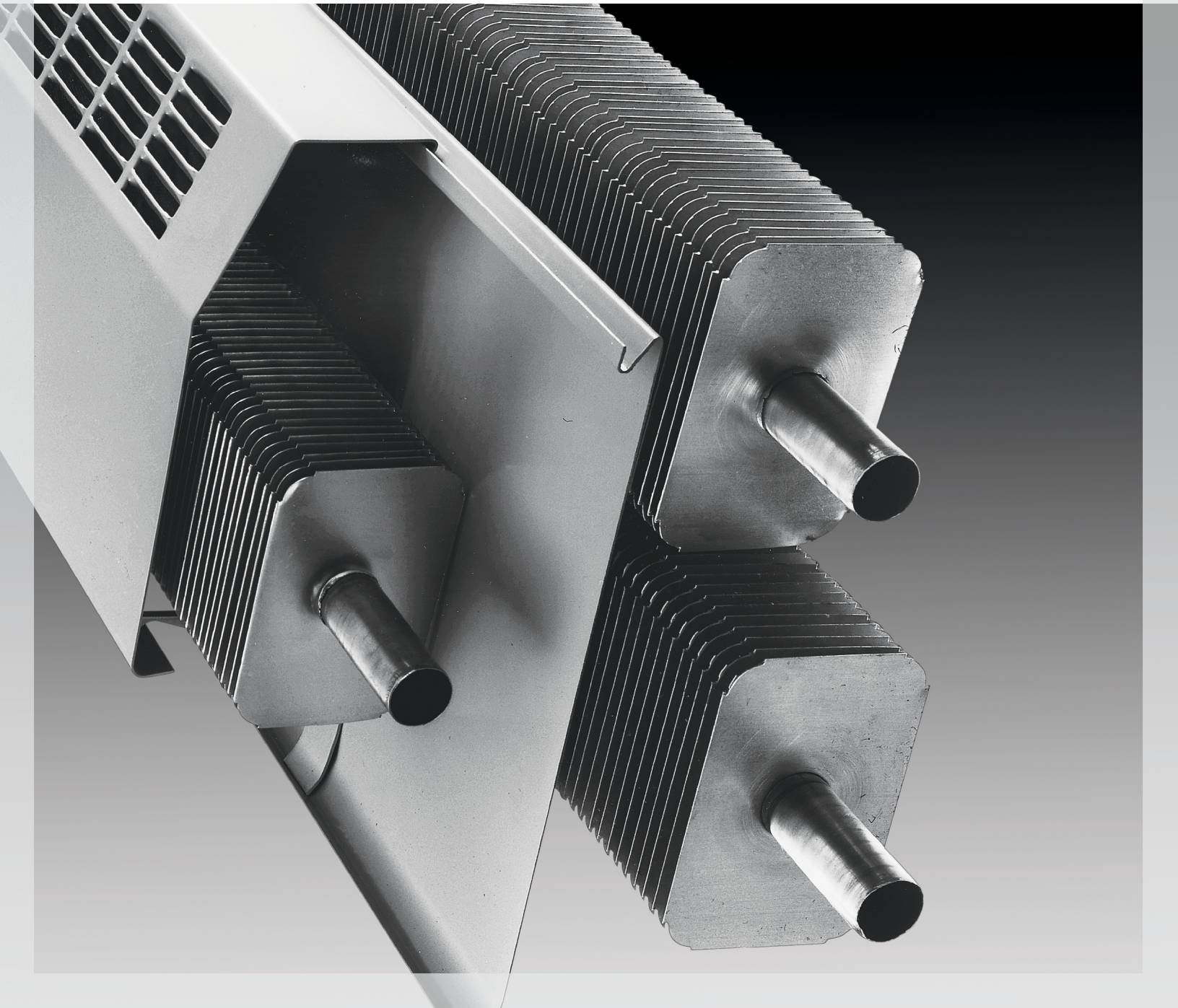
Rittling Econo-Line Enclosures

Catalog



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Zehnder decorative radiators

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Custom-building innovative hydronic systems for commerce, industry and institutions since 1946

Zehnder Rittling long ago coined the phrase “Reinventing Finned Tube” to describe its commitment to design innovation and its unlimited custom engineering capability. For decades, Zehnder Rittling’s constantly expanding inventory and proven ability to control costs without compromising the highest quality standards in manufacturing have made the name synonymous with image, performance, reliability, price, delivery and service.

Zehnder Rittling’s diversity and flexibility have freed architects from the constraints of designing around limited catalog selections of standard elements and enclosure configurations. Today Zehnder Rittling engineers can draw on, or modify, any of 42 different hydronic heating elements and 150 standard enclosure models to build any system an architect can draw to tolerances of less than 0.03125 inch, at an exceptionally competitive cost.

For the architects of the future, Zehnder Rittling will continue to advance finned tube technology in still more new directions and develop ever more efficient, cost-effective hydronic heat transfer systems.

Over sixty-five years of quality, innovation and service… and we’re just getting warmed up.

STEL enclosures

Features

Econo-Line slope-top baseboard enclosures from Zehnder Rittling are an excellent choice for light commercial applications such as banks, offices, hospitals and housing renovations.

Econo-Line is designed to provide high heat output through a sloped louvered grilled. The enclosures can accommodate nine types of Zehnder Rittling copper/aluminum finned tube with nominal diameters of 3/4, 1 or 1-1/4 inches, fins measuring 2-3/4 by 4 inches and fin spacing of 32, 40 or 48 per foot.

Enclosure sections are available in 15 lengths from 1 through 8 feet in 6 inch increments for a custom fit.

Enclosure:
- 14, 16, 18-gauge primed coated
- 1' to 8' lengths in 6" increments
- Powder coated finish, available in decorator colors)
- Stainless steel available

Copper/Aluminum Element
- Tube: 3/4", 1" or 1-1/4"
- Fin: 2-3/4" x 4"
- 1' to 12' lengths in 6" increments

(See our Element catalog for more information).

Mounting:
- 20 gauge full back panel, prime coated
- Urethane gasket for air seal available
- 4' or 8' lengths available

Hangers:
- 16 gauge galvanized.
- Fin clip (slider) 0.03" galvanized steel will accommodate 2-1/2 inch linear expansion for quiet operation.

Damper: (optional)
- Durable knob
- Security tamper proof

ETO and EXO enclosures

Features

For use with one, two, or three vertical rows of wall mounted finned tube. ETO (top-louvered outlet) and EXO (expanded metal) enclosures slip securely over one, two or three vertical rows of wall-mounted finned tube. The tube is set in place in Zehnder Rittling's universal, cradle-type expansion brackets and lagged to the wall at the desired height. These enclosures are used where protection of the element is the only concern, the enclosure rests directly on the element.

The EXO enclosure allows the open output similar to bare element applications, while preventing direct contact.

The ETO enclosure provides the appearance of an enclosure while protecting the element from contact.

Both enclosures can be removed without tools.

Enclosure:
- 14, 16, 18-gauge primed coated
- 1' to 8' lengths in 6" increments
- Powder coated finish, available in decorator colors)
- Stainless steel available

Copper/Aluminum Element
- Tube: 3/4", 1" or 1-1/4"
- Fin: 3-1/4" x 3-1/4" or 4-1/4" x 4-1/4"
- 1' to 12' lengths in 6" increments

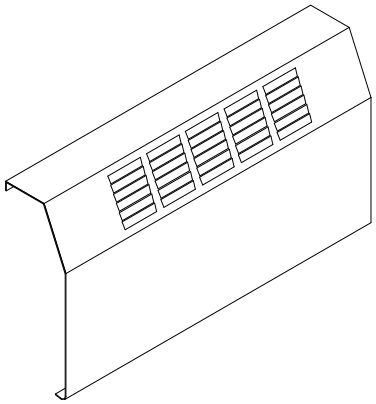
Steel Element
- Tube: 1", 1-1/4" or 2"
- Fin: 3-1/4" x 3-1/4" or 4-1/4" x 4-1/4"
- 1' to 12' lengths in 6" increments

(See our Finned Tube catalog for more information).

Hangers:
- Second row bracket, wall mounted.

Enclosure models

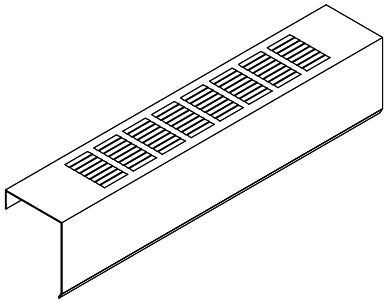
STEL



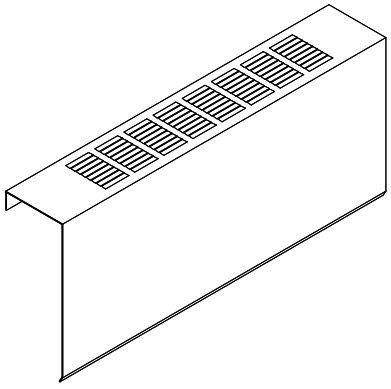
STEL:
Sloped louvered outlet, open inlet

Performance data, 4
Dimensional Data, 13

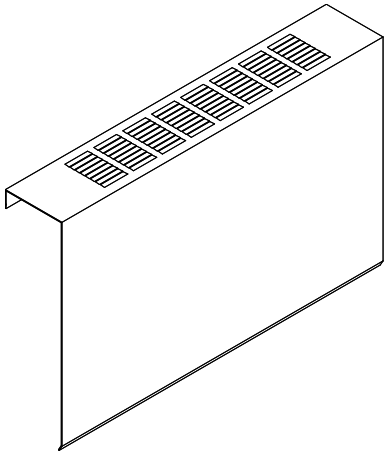
ETO



ETO:
Top louvered outlet, 1 row high



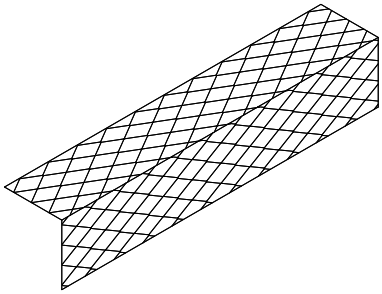
ETO:
Top louvered outlet, 2 rows high



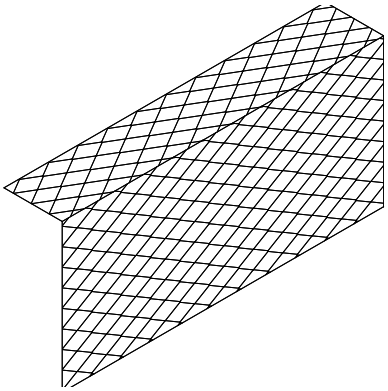
ETO:
Top louvered outlet, 3 rows high

Performance data, 5-8
Dimensional Data, 13

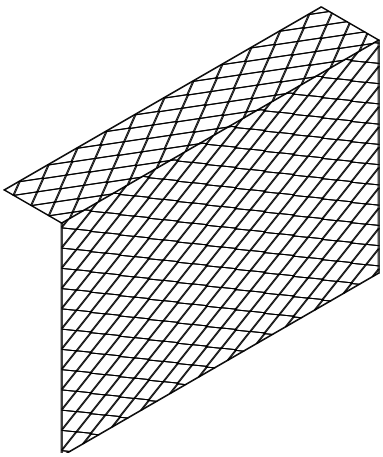
EXO



EXO:
Expanded metal, 1 row high



EXO:
Expanded metal, 2 rows high



EXO:
Expanded metal, 3 rows high

Performance data, 9-12
Dimensional Data, 13

Performance ratings

Model STEL

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		EDR* (ft2/ ft)	Steam heat	Hot water heat								
			215°F Factor of 1.00	240°F Factor of 1.25	230°F Factor of 1.14	220°F Factor of 1.05	210°F Factor of 0.95	200°F Factor of 0.86	190°F Factor of 0.78	180°F Factor of 0.69	170°F Factor of 0.61	160°F Factor of 0.53
Copper element												
¾" Dia. copper	¾C-2¾ X 4-32	4.40	**1060**	1325	1205	1115	1000	915	830	730	650	560
	¾C-2¾ X 4-40	4.80	**1150**	1435	1310	1210	1100	990	900	790	700	610
	¾C-2¾ X 4-48	5.20	**1240**	1550	1410	1300	1180	1070	970	850	760	660
1" Dia. copper	1C-2¾ X 4-32	4.30	**1030**	1280	1175	1080	980	890	800	710	630	550
	1C-2¾ X 4-40	4.70	**1130**	1400	1285	1190	1075	975	880	780	690	600
	1C-2¾ X 4-48	5.10	**1220**	1525	1390	1280	1160	1050	950	840	740	650
1¼" Dia. copper	1¼C-2¾ X 4-32	4.10	**980**	1225	1115	1030	930	845	760	680	600	520
	1¼C-2¾ X 4-40	4.60	**1100**	1375	1255	1155	1050	950	840	760	670	580
	1¼C-2¾ X 4-48	5.00	**1200**	1500	1370	1260	1140	1040	920	830	730	640

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommend-ed minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Steel element										
1" Dia. steel	1S-3¼ X 3¼-32	1	3-5/8	7-5/8	3.10	**750**	580	510	460	400
		2	9-5/8	13-5/8	5.20	**1270**	980	880	770	670
		3	15-5/8	19-5/8	6.30	**1500**	1190	1050	930	810
	1S-3¼ X 3¼-40	1	3-5/8	7-5/8	3.40	**820**	640	560	490	440
		2	9-5/8	13-5/8	5.70	**1390**	1080	960	850	730
		3	15-5/8	19-5/8	6.60	**1590**	1240	1090	970	840
	1S-3¼ X 3¼-48	1	3-5/8	7-5/8	3.70	**890**	690	610	540	470
		2	9-5/8	13-5/8	6.10	**1470**	1150	1010	900	780
		3	15-5/8	19-5/8	7.10	**1710**	1340	1180	1040	910
1" Dia. steel	1S-4¼ X 4¼-32	1	4-5/8	8-5/8	4.20	**1000**	780	690	610	530
		2	10-5/8	14-5/8	7.00	**1690**	1320	1160	1030	900
		3	16-5/8	20-5/8	8.00	**1930**	1500	1330	1170	1010
	1S-4¼ X 4¼-40	1	4-5/8	8-5/8	4.60	**1100**	860	760	670	580
		2	10-5/8	14-5/8	7.70	**1860**	1450	1280	1130	980
		3	16-5/8	20-5/8	8.40	**2010**	1570	1390	1230	1060
	1S-4¼ X 4¼-48	1	046	8.625	4.92	**1131**	880	780	690	600
		2	106	14.625	8.22	**1891**	1470	1300	1150	1000
		3	166	20.625	9.13	**2100**	1640	1450	1280	1110

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

Model ETO

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommend-ed minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Steel element										
1¼" Dia. steel	1¼S-3¼ X 3¼-32	1	3-5/8	7-5/8	3.20	**770**	600	530	470	410
		2	9-5/8	13-5/8	5.40	**1300**	1010	900	790	690
		3	15-5/8	19-5/8	6.50	**1560**	1220	1080	950	830
	1¼S-3¼ X 3¼-40	1	3-5/8	7-5/8	3.50	**840**	660	580	510	450
		2	9-5/8	13-5/8	5.90	**1420**	1110	980	870	750
		3	15-5/8	19-5/8	6.80	**1630**	1270	1120	990	860
	1¼S-3¼ X 3¼-48	1	3-5/8	7-5/8	3.80	**910**	710	630	560	480
		2	9-5/8	13-5/8	6.30	**1510**	1180	1040	920	800
		3	15-5/8	19-5/8	7.30	**1750**	1370	1210	1070	930
1¼" Dia. steel	1¼S-4¼ X 4¼-32	1	4-5/8	8-5/8	4.30	**1030**	800	710	630	550
		2	10-5/8	14-5/8	7.20	**1730**	1350	1190	1060	920
		3	16-5/8	20-5/8	8.20	**1970**	1540	1360	1200	1040
	1¼S-4¼ X 4¼-40	1	4-5/8	8-5/8	4.70	**1130**	880	780	690	600
		2	10-5/8	14-5/8	7.90	**1900**	1480	1310	1160	1010
		3	16-5/8	20-5/8	8.60	**2060**	1610	1420	1260	1090
	1¼S-4¼ X 4¼-48	1	4-5/8	8-5/8	5.10	**1220**	950	840	740	650
		2	10-5/8	14-5/8	8.50	**2040**	1590	1410	1240	1080
		3	16-5/8	20-5/8	9.40	**2260**	1760	1560	1380	1200
2" Dia. steel	2S-4¼ X 4¼-32	1	4-5/8	8-5/8	4.40	**1060**	830	730	650	560
		2	10-5/8	14-5/8	7.30	**1750**	1370	1210	1070	930
		3	16-5/8	20-5/8	7.80	**1870**	1460	1290	1140	990
	2S-4¼ X 4¼-40	1	4-5/8	8-5/8	5.10	**1220**	950	840	740	650
		2	10-5/8	14-5/8	8.50	**2040**	1590	1410	1240	1080
		3	16-5/8	20-5/8	8.80	**2110**	1650	1460	1290	1120
	2S-4¼ X 4¼-48	1	4-5/8	8-5/8	6.00	**1440**	1120	900	880	760
		2	10-5/8	14-5/8	9.80	**2350**	1830	1620	1430	1250
		3	16-5/8	20-5/8	10.00	**2400**	1870	1660	1460	1270

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

Model ETO

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommended minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Copper/aluminum element										
¾" Dia. copper	¾C-3¼ X 3¼-32	1	3-5/8	7-5/8	3.70	**900**	700	630	550	470
		2	9-5/8	13-5/8	6.50	**1570**	1220	1080	950	830
		3	15-5/8	19-5/8	8.50	**2060**	1610	1410	1250	1090
	¾C-3¼ X 3¼-40	1	3-5/8	7-5/8	4.00	**970**	760	670	600	520
		2	9-5/8	13-5/8	6.90	**1660**	1290	1140	950	870
		3	15-5/8	19-5/8	8.00	**1930**	1500	1330	1180	1030
	¾C-3¼ X 3¼-48	1	3-5/8	7-5/8	4.30	**1050**	810	720	640	560
		2	9-5/8	13-5/8	7.30	**1730**	1350	1190	1060	910
		3	15-5/8	19-5/8	8.30	**1950**	1530	1340	1190	1040
¾" Dia. copper	¾C-4¼ X 4¼-32	1	4-5/8	8-5/8	5.50	**1310**	1030	900	800	690
		2	10-5/8	14-5/8	9.20	**2220**	1730	1530	1350	1170
		3	16-5/8	20-5/8	10.90	**2620**	2040	1800	1600	1380
	¾C-4¼ X 4¼-40	1	4-5/8	8-5/8	6.00	**1430**	1120	980	870	760
		2	10-5/8	14-5/8	9.70	**2350**	1840	1630	1430	1250
		3	16-5/8	20-5/8	11.20	**2680**	2090	1840	1630	1410
	¾C-4¼ X 4¼-48	1	4-5/8	8-5/8	6.20	**1490**	1160	1030	910	790
		2	10-5/8	14-5/8	10.00	**2410**	1880	1670	1470	1280
		3	16-5/8	20-5/8	11.30	**2720**	2120	1870	1660	1430
1" Dia. copper	1C-3¼ X 3¼-32	1	3-5/8	7-5/8	3.70	**890**	690	610	540	470
		2	9-5/8	13-5/8	6.40	**1540**	1200	1060	940	820
		3	15-5/8	19-5/8	8.40	**2020**	1580	1390	1230	1070
	1C-3¼ X 3¼-40	1	3-5/8	7-5/8	4.00	**960**	750	660	590	510
		2	9-5/8	13-5/8	6.80	**1630**	1270	1120	990	860
		3	15-5/8	19-5/8	7.90	**1900**	1480	1310	1160	1010
	1C-3¼ X 3¼-48	1	3-5/8	7-5/8	4.30	**1030**	800	710	630	650
		2	9-5/8	13-5/8	7.10	**1700**	1330	1170	1040	900
		3	15-5/8	19-5/8	8.00	**1920**	1500	1320	1170	1020
1" Dia. copper	1C-4¼ X 4¼-32	1	4-5/8	8-5/8	5.40	**1290**	1010	890	790	680
		2	10-5/8	14-5/8	9.10	**2180**	1700	1500	1330	1150
		3	16-5/8	20-5/8	10.70	**2570**	2000	1770	1570	1360
	1C-4¼ X 4¼-40	1	4-5/8	8-5/8	5.90	**1410**	1100	970	860	750
		2	10-5/8	14-5/8	9.60	**2310**	1810	1600	1410	1230
		3	16-5/8	20-5/8	11.00	**2630**	2050	1810	1600	1390
	1C-4¼ X 4¼-48	1	4-5/8	8-5/8	6.10	**1470**	1140	1010	900	780
		2	10-5/8	14-5/8	9.90	**2370**	1850	1640	1450	1260
		3	16-5/8	20-5/8	11.10	**2670**	2080	1840	1630	1410

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

Model ETO

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommend-ed minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Copper/aluminum element										
1¼" Dia. copper	1¼C-3¼ X 3¼-32	1	3-5/8	7-5/8	3.90	**940**	730	650	570	500
		2	9-5/8	13-5/8	6.50	**1560**	1220	1080	950	830
		3	15-5/8	19-5/8	8.00	**1920**	1500	1320	1170	1020
	1¼C-3¼ X 3¼-40	1	3-5/8	7-5/8	4.30	**1030**	800	710	630	550
		2	9-5/8	13-5/8	7.00	**1680**	1310	1160	1020	890
		3	15-5/8	19-5/8	8.20	**1970**	1540	1360	1200	1040
	1¼C-3¼ X 3¼-48	1	3-5/8	7-5/8	4.50	**1080**	840	750	660	570
		2	9-5/8	13-5/8	7.10	**1700**	1330	1170	1040	900
		3	15-5/8	19-5/8	8.30	**1990**	1550	1370	1210	1050
1¼" Dia. copper	1¼C-4¼ X 4¼-32	1	4-5/8	8-5/8	5.30	**1270**	990	880	770	670
		2	10-5/8	14-5/8	8.90	**2140**	1670	1480	1310	1130
		3	16-5/8	20-5/8	10.50	**2520**	1970	1740	1540	1340
	1¼C-4¼ X 4¼-40	1	4-5/8	8-5/8	5.80	**1390**	1080	960	850	740
		2	10-5/8	14-5/8	9.50	**2280**	1780	1570	1390	1210
		3	16-5/8	20-5/8	10.80	**2590**	2020	1790	1580	1370
	1¼C-4¼ X 4¼-48	1	4-5/8	8-5/8	6.00	**1440**	1120	990	880	760
		2	10-5/8	14-5/8	9.70	**2330**	1820	1610	1420	1230
		3	16-5/8	20-5/8	10.90	**2620**	2040	1810	1600	1390

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

Model EXO

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommend-ed minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Steel element										
1" Dia. steel	1S-3¼ X 3¼-32	1	3-1/2	7-1/2	3.70	**890**	690	610	540	470
		2	9-1/2	13-1/2	6.50	**1570**	1230	1080	960	830
		3	15-1/2	19-1/2	9.10	**2180**	1700	1500	1330	1150
	1S-3¼ X 3¼-40	1	3-1/2	7-1/2	4.00	**960**	740	660	580	500
		2	9-1/2	13-1/2	7.10	**1710**	1340	1180	1040	910
		3	15-1/2	19-1/2	9.60	**230**	1790	1580	1400	1220
	1S-3¼ X 3¼-48	1	3-1/2	7-1/2	4.40	**1050**	820	730	640	550
		2	9-1/2	13-1/2	7.60	**1830**	1430	1260	1110	970
		3	15-1/2	19-1/2	10.20	**2460**	1930	1700	1500	1310
1" Dia. steel	1S-4¼ X 4¼-32	1	4-1/2	8-1/2	4.90	**1170**	920	810	710	620
		2	10-1/2	14-1/2	8.70	**2090**	1630	1450	1280	1100
		3	16-1/2	20-1/2	11.50	**2770**	2160	1910	1690	1470
	1S-4¼ X 4¼-40	1	4-1/2	8-1/2	5.30	**1290**	1000	890	790	680
		2	10-1/2	14-1/2	9.50	**2280**	1780	1570	1390	1200
		3	16-1/2	20-1/2	12.10	**2920**	2270	2010	1780	1540
	1S-4¼ X 4¼-48	1	045	8.5	5.82	**1340**	1040	920	820	710
		2	105	14.5	10.16	**2337**	1820	1610	1430	1240
		3	165	20.5	13.09	**3012**	2350	2080	1840	1600

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

Model EXO

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommend-ed minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Steel element										
1¼" Dia. steel	1¼S-3¼ X 3¼-32	1	3-1/2	7-1/2	3.80	**910**	710	630	560	480
		2	9-1/2	13-1/2	6.70	**1610**	1260	1110	980	850
		3	15-1/2	19-1/2	9.30	**2230**	1740	1540	1360	1180
	1¼S-3¼ X 3¼-40	1	3-1/2	7-1/2	4.10	**980**	760	680	600	520
		2	9-1/2	13-1/2	7.30	**1750**	1370	1210	1070	930
		3	15-1/2	19-1/2	9.80	**2350**	1830	1620	1430	1250
	1¼S-3¼ X 3¼-48	1	3-1/2	7-1/2	4.50	**1080**	840	750	660	570
		2	9-1/2	13-1/2	7.80	**1870**	1460	1290	1140	990
		3	15-1/2	19-1/2	10.50	**2520**	1970	1740	1540	1340
1¼" Dia. steel	1¼S-4¼ X 4¼-32	1	4-1/2	8-1/2	5.00	**1200**	940	830	730	640
		2	10-1/2	14-1/2	8.90	**2140**	1670	1480	1310	1130
		3	16-1/2	20-1/2	11.80	**2830**	2210	1950	1730	1500
	1¼S-4¼ X 4¼-40	1	4-1/2	8-1/2	5.50	**1320**	1030	910	810	700
		2	10-1/2	14-1/2	9.70	**2330**	1820	1610	1420	1230
		3	16-1/2	20-1/2	12.40	**2980**	2320	2060	1820	1580
	1¼S-4¼ X 4¼-48	1	4-1/2	8-1/2	6.00	**1440**	1120	990	880	760
		2	10-1/2	14-1/2	10.50	**2520**	1970	1740	1540	1340
		3	16-1/2	20-1/2	13.50	**3240**	2530	2240	1980	1720
2" Dia. steel	2S-4¼ X 4¼-32	1	4-1/2	8-1/2	5.10	**1220**	950	840	740	650
		2	10-1/2	14-1/2	9.00	**2160**	1680	1490	1320	1140
		3	16-1/2	20-1/2	11.30	**2710**	2110	1870	1650	1440
	2S-4¼ X 4¼-40	1	4-1/2	8-1/2	6.00	**1440**	1120	990	880	760
		2	10-1/2	14-1/2	10.50	**2520**	1970	1740	1540	1340
		3	16-1/2	20-1/2	12.60	**3020**	2360	2080	1840	1600
	2S-4¼ X 4¼-48	1	4-1/2	8-1/2	7.10	**1700**	1330	1170	1040	900
		2	10-1/2	14-1/2	12.10	**2900**	2260	2000	1770	1540
		3	16-1/2	20-1/2	14.30	**3430**	2580	2370	2090	1820

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

Model EXO

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommended minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Copper/aluminum element										
¾" Dia. copper	¾C-3¼ X 3¼-32	1	3-1/2	7-1/2	4.40	**1080**	740	840	660	570
		2	9-1/2	13-1/2	8.10	**1950**	1340	1530	1190	1040
		3	15-1/2	19-1/2	11.30	**2710**	1870	2110	1650	1430
	¾C-3¼ X 3¼-40	1	3-1/2	7-1/2	4.80	**1170**	800	910	710	620
		2	9-1/2	13-1/2	8.50	**2060**	1410	1610	1250	1090
		3	15-1/2	19-1/2	11.70	**2810**	1930	2190	1710	1480
	¾C-3¼ X 3¼-48	1	3-1/2	7-1/2	5.10	**1220**	840	950	740	650
		2	9-1/2	13-1/2	8.80	**2130**	1460	1660	1290	1130
		3	15-1/2	19-1/2	11.70	**2810**	1930	2190	1710	1480
¾" Dia. copper	¾C-4¼ X 4¼-32	1	4-1/2	8-1/2	6.40	**1530**	1060	1190	930	810
		2	10-1/2	14-1/2	11.30	**2720**	1870	2120	1660	1440
		3	16-1/2	20-1/2	15.40	**3700**	2560	2890	2260	1960
	¾C-4¼ X 4¼-40	1	4-1/2	8-1/2	7.00	**1680**	1160	1300	1020	880
		2	10-1/2	14-1/2	12.00	**2890**	1990	2250	1760	1530
		3	16-1/2	20-1/2	15.90	**3820**	2640	2980	2330	2020
	¾C-4¼ X 4¼-48	1	4-1/2	8-1/2	7.10	**1770**	1220	1380	1090	940
		2	10-1/2	14-1/2	12.30	**2950**	2050	2310	1800	1570
		3	16-1/2	20-1/2	16.00	**3840**	2650	2990	2340	2040
1" Dia. copper	1C-3¼ X 3¼-32	1	3-1/2	7-1/2	4.40	**1060**	730	830	650	560
		2	9-1/2	13-1/2	8.00	**1920**	1320	1500	1170	1020
		3	15-1/2	19-1/2	11.10	**2660**	1840	2070	1620	1410
	1C-3¼ X 3¼-40	1	3-1/2	7-1/2	4.80	**1150**	790	900	700	610
		2	9-1/2	13-1/2	8.40	**2020**	1390	1580	1230	1070
		3	15-1/2	19-1/2	11.50	**2760**	1900	2150	1680	1460
	1C-3¼ X 3¼-48	1	3-1/2	7-1/2	5.00	**1200**	830	940	730	640
		2	9-1/2	13-1/2	8.70	**2090**	1440	1630	1270	1110
		3	15-1/2	19-1/2	11.50	**2760**	1900	2150	1680	1460
1" Dia. copper	1C-4¼ X 4¼-32	1	4-1/2	8-1/2	6.30	**1500**	1040	1170	920	800
		2	10-1/2	14-1/2	11.10	**2670**	1840	2080	1630	1420
		3	16-1/2	20-1/2	15.10	**3630**	2510	2840	2220	1930
	1C-4¼ X 4¼-40	1	4-1/2	8-1/2	6.90	**1650**	1140	1280	1000	870
		2	10-1/2	14-1/2	11.80	**2840**	1960	2210	1730	1500
		3	16-1/2	20-1/2	15.60	**3750**	2590	2930	2290	1990
	1C-4¼ X 4¼-48	1	4-1/2	8-1/2	7.20	**1740**	1200	1360	1070	930
		2	10-1/2	14-1/2	12.10	**2900**	2010	2270	1770	1540
		3	16-1/2	20-1/2	15.70	**3770**	2600	2940	2300	2000

***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Performance ratings

Model EXO

In BTU/hr per active (finned) lineal foot of tube at entering air temperature of 65°F

Element		Rows of element (on 6-inch centers)	Enclosure height (in inches)	Recommend-ed minimum installed height (in inches)	EDR* (ft2/ ft)	Steam heat	Hot water heat			
						215°F factor of 1.00	190°F factor of 0.78	180°F factor of 0.69	170°F factor of 0.61	160°F factor of 0.53
Copper/aluminum element										
1¼" Dia. copper	1¼C-3¼ X 3¼-32	1	3-1/2	7-1/2	4.60	**1100**	760	860	670	580
		2	9-1/2	13-1/2	8.10	**1940**	1340	1510	1180	1030
		3	15-1/2	19-1/2	11.50	**2760**	1900	2150	1680	1460
	1¼C-3¼ X 3¼-40	1	3-1/2	7-1/2	5.00	**1200**	830	940	730	640
		2	9-1/2	13-1/2	8.60	**2060**	1420	1610	1260	1090
		3	15-1/2	19-1/2	11.90	**2860**	1970	2230	1740	1520
	1¼C-3¼ X 3¼-48	1	3-1/2	7-1/2	5.20	**1250**	860	980	760	660
		2	9-1/2	13-1/2	8.80	**2110**	1460	1650	1290	1120
		3	15-1/2	19-1/2	11.90	**2860**	1970	2230	1740	1520
1¼" Dia. copper	1¼C-4¼ X 4¼-32	1	4-1/2	8-1/2	6.20	**1490**	1030	1160	910	790
		2	10-1/2	14-1/2	11.00	**2640**	1820	2060	1610	1400
		3	16-1/2	20-1/2	15.00	**3600**	2480	2810	2200	1910
	1¼C-4¼ X 4¼-40	1	4-1/2	8-1/2	6.80	**1630**	1120	1270	990	860
		2	10-1/2	14-1/2	11.70	**2810**	1940	2190	1710	1490
		3	16-1/2	20-1/2	15.50	**3720**	2570	2900	2270	1970
	1¼C-4¼ X 4¼-48	1	4-1/2	8-1/2	7.20	**1730**	1190	1350	1060	920
		2	10-1/2	14-1/2	12.00	**2880**	1990	2250	1760	1530
		3	16-1/2	20-1/2	15.60	**3740**	2580	2920	2280	1980

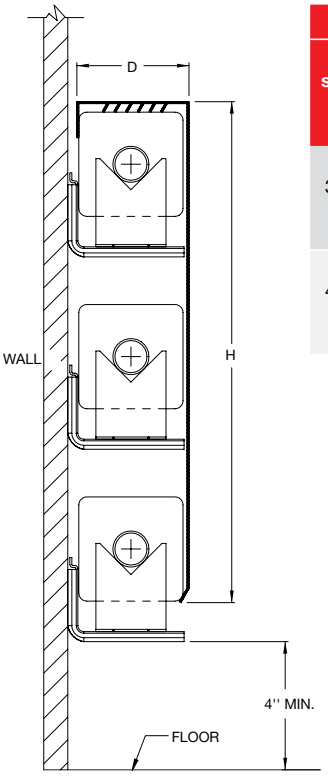
***EDR - Equivalent Direct Radiation area (for steam heat) per active (finned) lineal foot of tube.**

Important Rating Information Performance ratings based on:

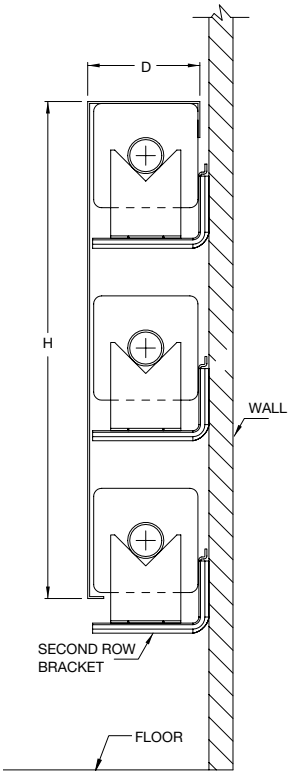
- Installation at height shown. (Lower heights are not recommended. For greater heights, refer to EZselect selection software.)
- Entering air temperature of 65°F. (For other temperatures, refer to EZselect selection software.)
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

Dimensions and data

ETO, EXO and STEL



ETO			
Fin sizes for finned tube*	Rows of finned tube	D (depth)	H (height)
3-1/4" x 3-1/4"	1	3-1/2"	3-5/8"
	2		9-5/8"
	3		15-5/8"
4-1/4" x 4-1/4"	1	4-1/2"	4-5/8"
	2		10-5/8"
	3		16-5/8"

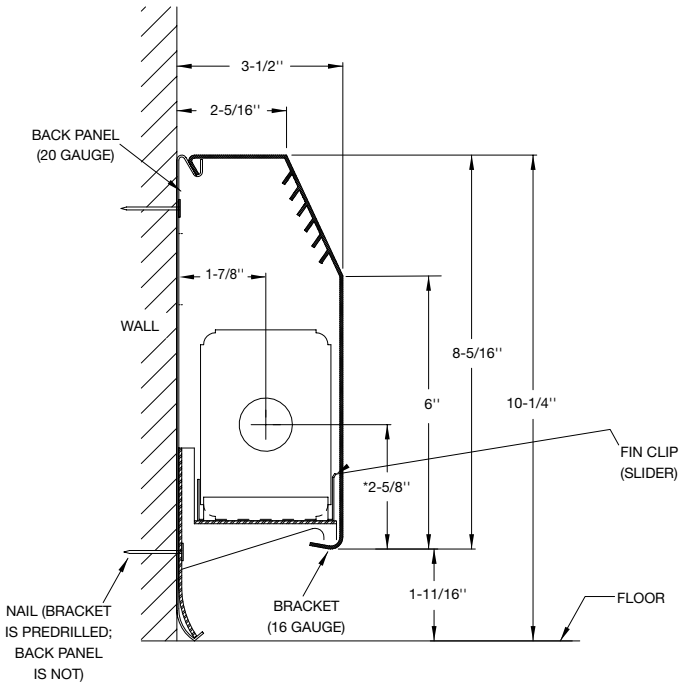


ETO			
Fin sizes for finned tube*	Rows of finned tube	D (depth)	H (height)
3-1/4" x 3-1/4"	1	3-1/2"	3-1/2"
	2		9-1/2"
	3		15-1/2"
4-1/4" x 4-1/4"	1	4-1/2"	4-1/2"
	2		10-1/2"
	3		16-1/2"

Note:

- *Consult factory to fit tube with 2-3/4" x 4" fins.
- Enclosures are available in 1 foot to 8 foot lengths in 6 inch increments.

Sloped economy STEL

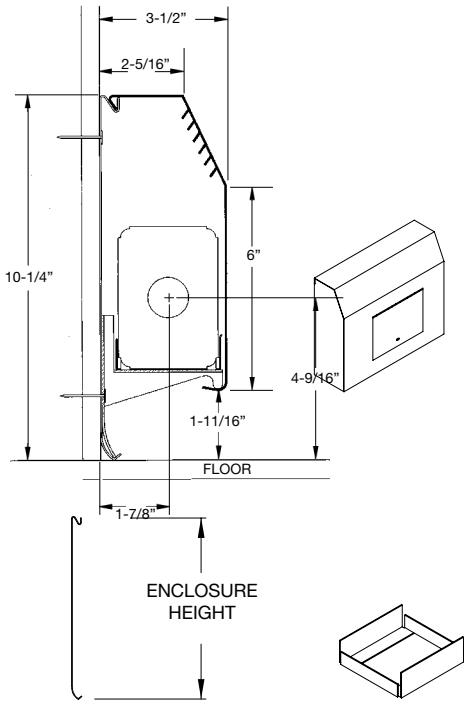


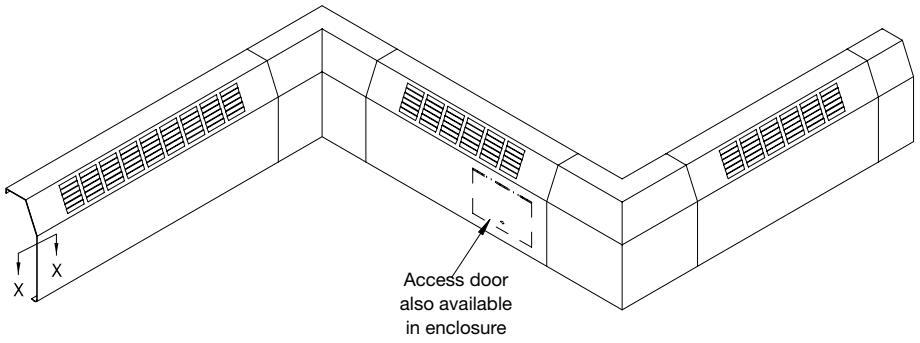
Notes:

- *Center lines are based on 1" copper tube.

Accessories

STEL

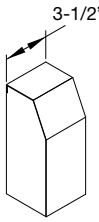




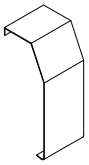
"STEL-BP"
Back panel

"STEL-AL"
Element slider

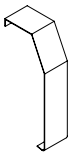
"STELBRKT"
Element bracket



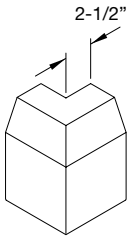
"EC"
End cap
(left hand shown)



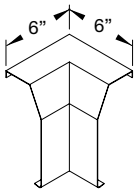
"WT"
Wall trim strip
3-1/2", 5", 7-1/2"



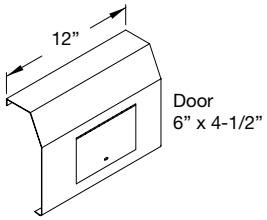
"JNR"
Joining trim
strip 2"



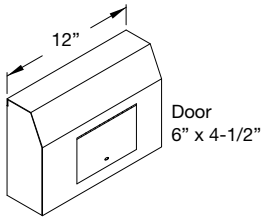
"OC"
Outside corner



"IC"
Inside corner

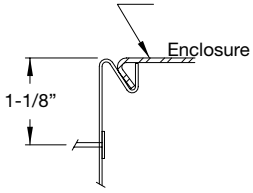


"AP"
Access panel with access door, overlapping style only (security lock opt.)



"AC"
End cap with access door, left side shown (security lock opt.)

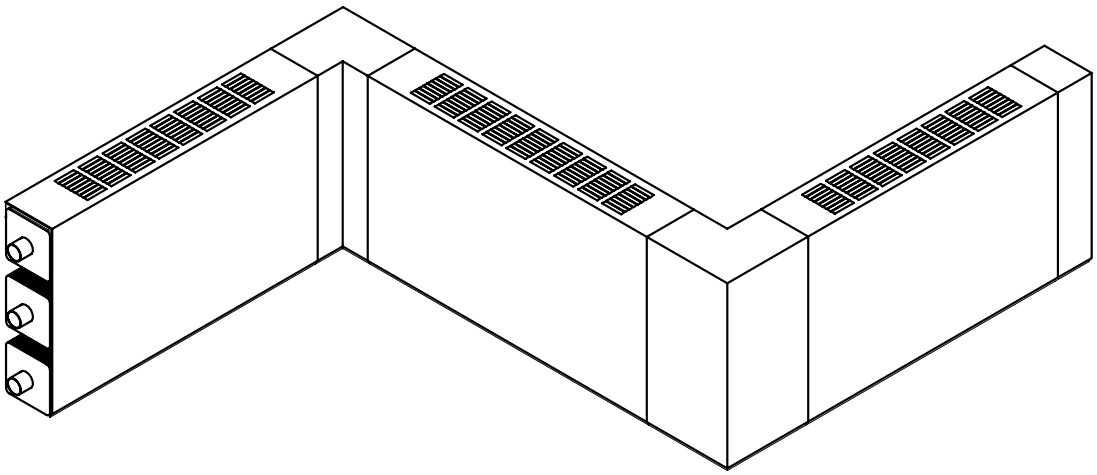
Knob damper



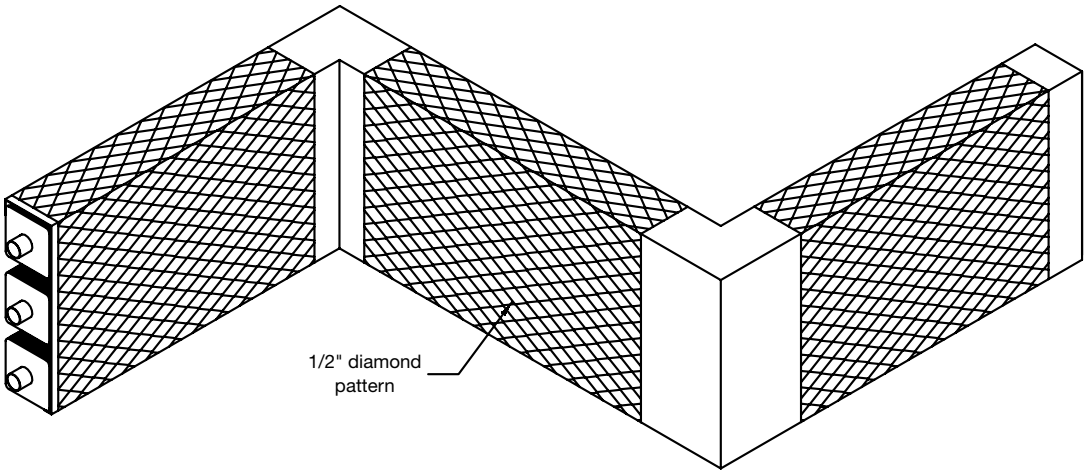
Back panel detail

Accessories

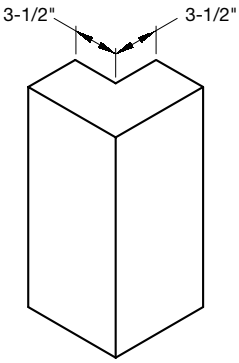
ETO



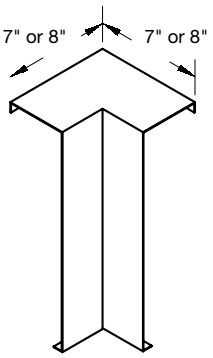
EXO



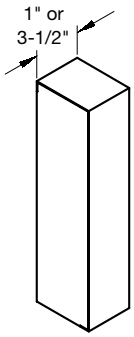
Slip-in
second row
bracket



"OC"
Outside corner



"IC"
EXO (8") or ETO (7")
inside corner



"EC"
EXO (1") or ETO (3-1/2")
end cap (left hand shown)

"WT"
Wall trim strip
3-1/2", 5", 7-1/2"

Design data

The Institute of Boiler and Radiator Manufacturers sponsored a test program
at the University of Illinois to determine the effect of water velocity on heat output of various sizes of finned tubed element.

The results of this test show that when the water velocity falls below 0.4 f.p.s., the flow changes from turbulent to streamline. With systems designed at water velocities below this point the output cannot be accurately predicted so should always be avoided.

Figure 1 shows rating factors that can be utilized when the water velocity falls below 3 f.p.s.

It is recommended when designing low-load systems that the water velocity be a key factor in element selection.
For more information on this topic, please refer to the 1969 equipment volume of ASHRAE Guide and Data Book Page #393.

Figure 2
Pipe water capacities and quantities circulated at velocity of 3 feet per second*

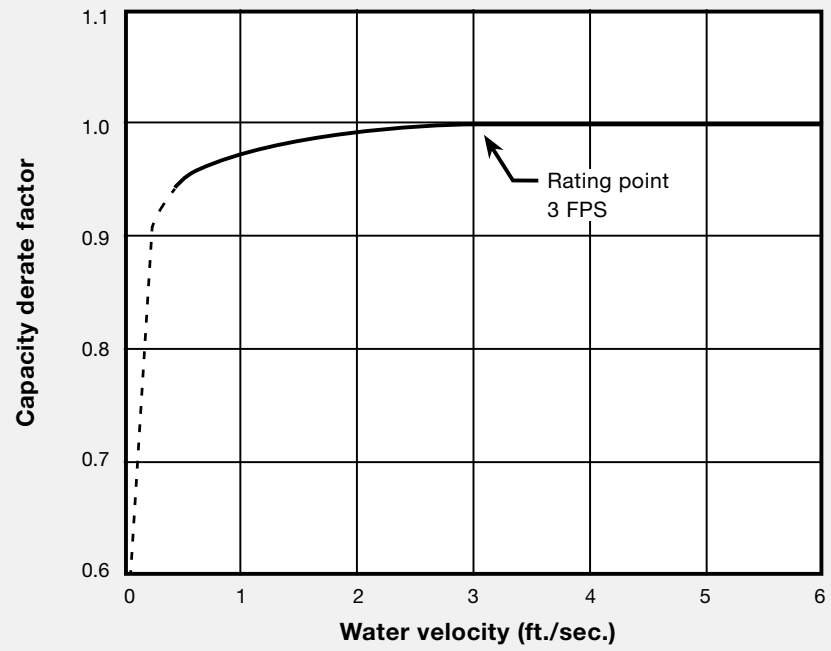
Pipe Size	Gallons per linear foot	Gallons per minute*	Pounds per hour*
1/2"	.016	2.88	1440
3/4"	.023	4.14	2070
1"	.040	7.20	3600
1-1/4"	.063	11.34	5660
1-1/2"	.102	18.36	9160
2"	.170	30.60	15300
2-1/2"	.275	49.50	24850
3"	.390	70.20	35000

Note:
- *3 feet per second velocity is basis for hot water rating factors shown on this page

$$\text{Velocity ft./sec.} = \frac{\text{lbs./hr.}}{\text{(gal./ft.) (3600) (8.3)}}$$

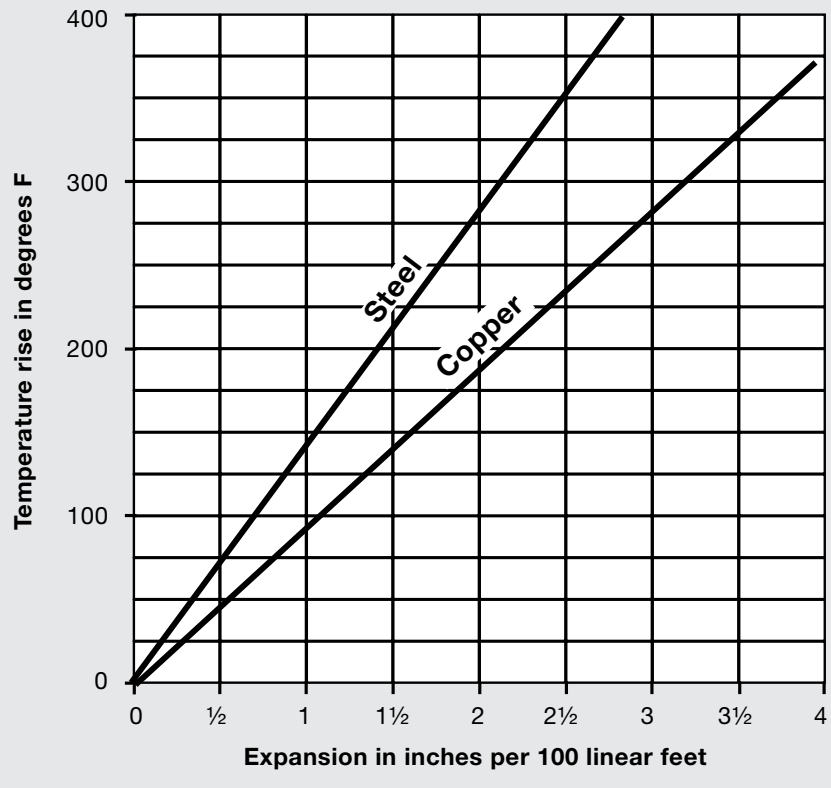
The effects of water velocity on finned tube output

Figure 1
Effect of Water Velocity on Finned Tube Output



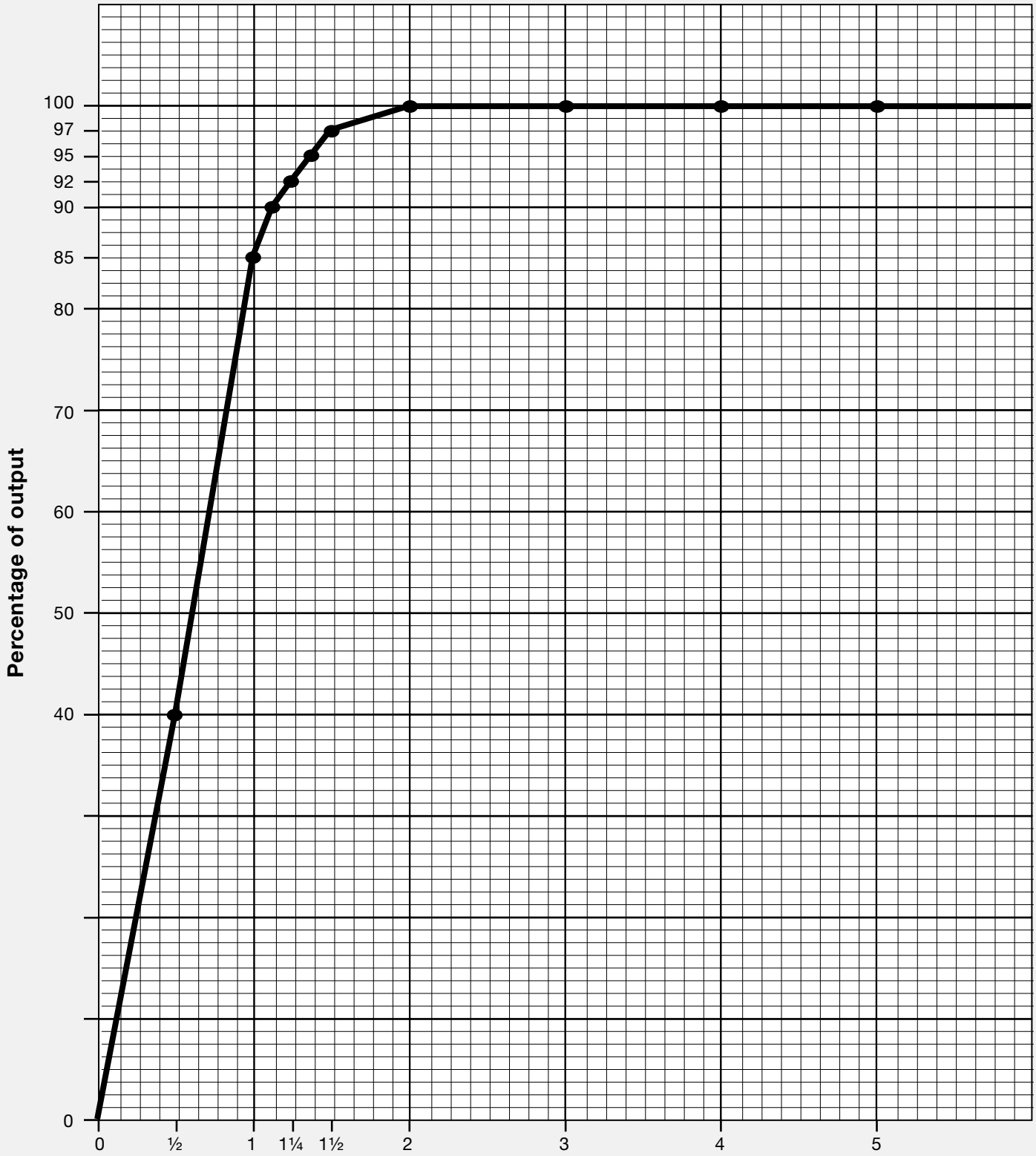
Note:
- ---- below critical velocity

Figure 3
Expansion in steel and copper piping



Design data

Figure 4 - Inlet vs. output / BTUH capacity reduction



Recommended minimum inlet opening 1-1/2". Applicable to commercial finned-tube only

Mechanical specifications

General
Furnish and install finned tube heating elements and enclosures as indicated on plans, with required mounting components and accessories. Material shall be manufactured in accordance with Zehnder Rittling's High Quality Standards.

Steel heating elements
Steel heating elements shall consist of 0.027" thick galvanized fins permanently bonded to high pressure A106 seamless schedule 40B steel tubing by mechanically expanding the steel tubing to the steel fins. Steel tube wall thickness; 1" dia. - 0.133", 1-1/4" dia. - 0.140", 2" dia - 0.154", prior to tube expansion.

Guaranteed working pressures:
1" IPS - 780 psig at temperature up to 650°F. 1-1/4" IPS - 660 psig at temperatures up to 650°F.
2" IPS - 405 psig at temperatures up to 650°F.

Copper-aluminum heating elements
Copper-aluminum heating elements shall consist of 0.016" thick, 1100 grade aluminum fins permanently bonded to lightly annealed copper alloy 122 seamless drawn tubing by mechanically expanding the copper tubing to the aluminum fins. Copper tube wall thickness; 3/4" dia - 0.020", 1" dia. - 0.025", 1-1/4" dia. - 0.028", prior to tube expansion. Copper tube meets the following ASTM standard designations: ASTM B42, ASTM B68, ASTM B75, ASTM B88, ASTM B111, ASTM B152, ASTM B280.

Guaranteed working pressures:
1-1/4" CU - 194 psig at temperatures up to 300°F. 1" CU - 204 psig at temperature up to 300°F. 3/4" CU - 218 psig at temperatures up to 300°F.

ETO enclosures and accessories
Enclosures shall be of the type as shown on the drawings. Enclosures shall be manufactured from 14, 16 or 18 gauge cold rolled steel. Enclosures to be designed to snap on and rest directly on the heating element. No sheet metal screws or other fastening devices shall be visible.

EXO enclosures and accessories
Enclosures shall be of the type as shown on the drawings. Enclosures shall be manufactured from 16 or 18 gauge expanded metal. Enclosures to be designed to snap on and rest directly on the heating element. Edges of enclosure to be hemmed to provide a rounded edge. No sheet metal screws or other fastening devices shall be visible.

ETO/EXO hanger brackets
All hanger brackets shall be die formed for rigidity. Brackets to be designed to support the heating element and enclosure. Brackets to be suitable for one, two or three row applications.

All hangers must provide for lengthwise movement of elements during expansion and contraction as well as aligning elements to prevent contact with brackets, walls or enclosures.

Paint:
All enclosures and accessories shall be degreased and chemically phosphatized before application of a durable, attractive, electrostatic epoxy powder coating. Decorator colors are available from Zehnder Rittling's color selector chart.

Special applications

Zehnder Rittling's reputation for leadership in commercial heating systems design and fabrication thrives on a demonstrated ability
to modify or adapt components from our vast standard inventory and to break new ground with innovative applications.

Our ingenuity and expertise free architects from the constraints of hydronic-heating conventions. We can, for instance, customize enclosures to any dimensions in stainless, textured embossed, or perforated steel for installation anywhere: in ceilings, walls, or trenches. We'll angle finned tube systems to match the wall or slope of a floor. We can even fabricate the enclosure to match the curve of a wall. We'll fabricate all copper heating elements, bronze anodized and other specialty outlet grilles, or pipe enclosures without grilles. Challenge us and we'll build it!

If you have a special application you would like us to evaluate, please call to arrange a consultation with a Zehnder Rittling expert.

The brand with the best indoor climate solutions.

FOUR COMPLEMENTARY PRODUCT LINES

The broad and clearly structured portfolio from the Zehnder Group is split into four product lines. Consequently, we can provide the right product, the perfect system and the matching service for all types of projects - from new builds to renovations, single- or multiple- family homes, as well as commercial projects. This variety ensures that our wealth of experience is continuously expanding, providing tangible added value to our customers on a daily basis.

Decorative radiators
Our individual decorative radiators for living and bathrooms not only make a home warmer but also more attractive. Created by renowned designers, they impress with excellent functionality.

NUMBERS THAT SPEAK FOR THEMSELVES

MANUFACTURER OF THE
1ST
STEEL RADIATOR IN THE WORLD

121
YEARS OF INNOVATIVE TRADITION

AROUND
3,000
EMPLOYEES

FOUNDED IN
1895

REPRESENTED IN **19** COUNTRIES

1,800,000
TONNES OF CO_2 SAVED SINCE 2005

WARRANTY

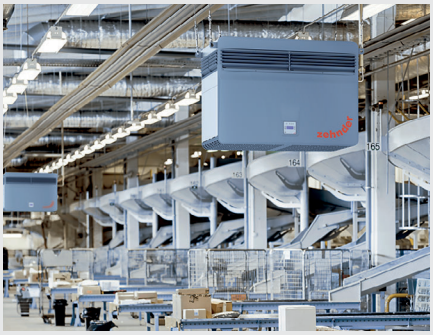
Zehnder guarantees its products to be free from defects in material and workmanship for a period of one year from date of shipment from our Buffalo, New York factory.

Should there be any defects in the good(s), the purchaser should promptly notify Zehnder and upon receipt of written consent from Zehnder , the purchaser shall return the defective good(s) to the factory for inspection with freight prepaid. If inspection shows the goods to be defective, Zehnder will at its discretion repair or replace the said item(s).

Defects arising from damage due to shipment, improper installation, negligence or misuse by others are not covered by this warranty.

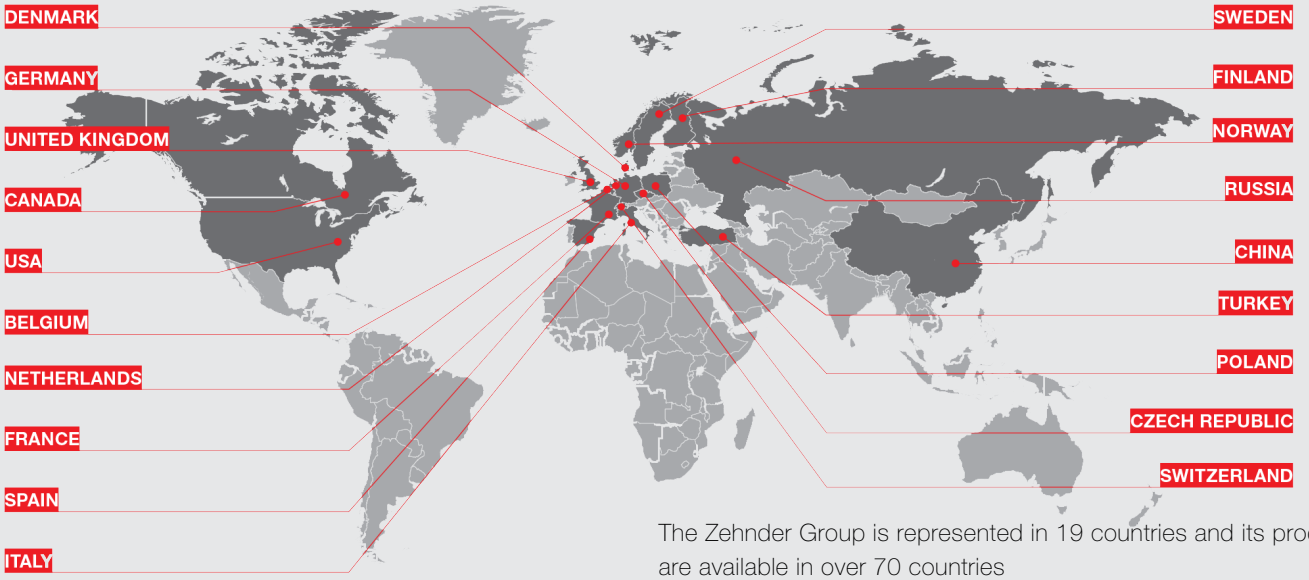
Comfortable indoor ventilation
Our comfortable indoor ventilation is energy-efficient and provides a healthy indoor climate. It promotes the well-being of the occupants and increases the value of the property.

Heating and cooling ceiling systems
Zehnder heating and cooling ceiling systems are convenient and energy-efficient for heating and cooling. They are perfectly attuned to the relevant environment.



Clean air solutions
Clean air solutions from Zehnder reduce the level of dust in the air, create a healthier working climate and reduce the amount of cleaning required.

BEST CLIMATE IN THE WORLD



The Zehnder Group is represented in 19 countries and its products are available in over 70 countries

This warranty is extended only to the original purchaser from Zehnder.

IMPORTANT: Approved submittal documentation, specific to each project, supersedes the general guidelines contained within this document.

zehnder

The Zehnder brand offers excellent indoor climate solutions within the sectors of decorative radiators, clean air solutions, comfortable indoor ventilation and heating and cooling ceiling systems.

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