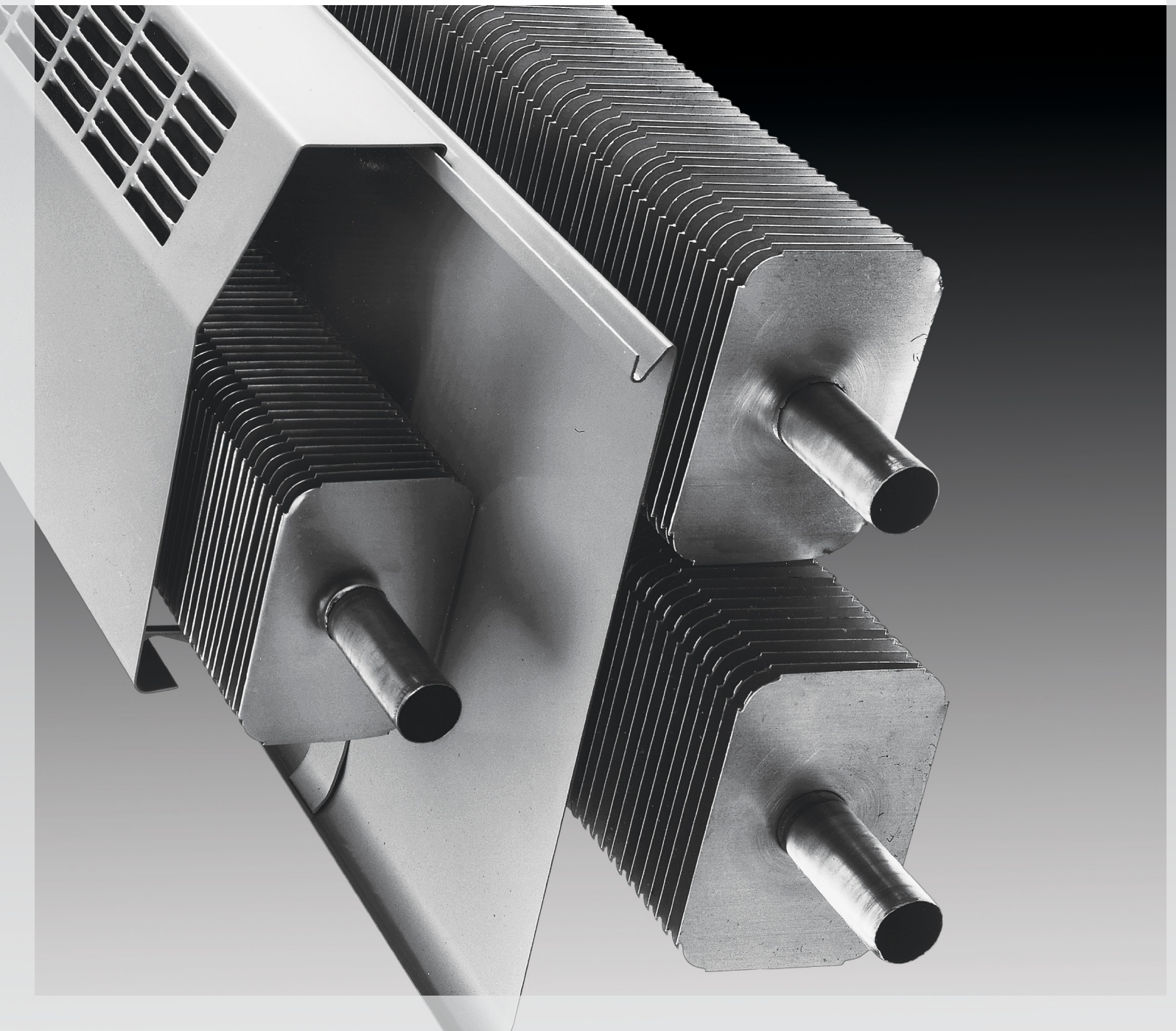


# Rittling Econo-Line Enclosures

Catalog









Zehnder decorative radiators



Heating and cooling ceiling systems



Comfortable indoor ventilation



Clean air solutions

Always the best climate for

# IMPROVED QUALITY OF LIFE

*With Zehnder, you will find the perfect climate for any space.*

[www.zehnder-systems.com](http://www.zehnder-systems.com)



---

# 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.

|  |    |
|--|----|
| <a href="#"><u>Overview</u></a>                  | 2  |
| <a href="#"><u>Models</u></a>                    | 3  |
| <a href="#"><u>STEL Performance ratings</u></a>  | 4  |
| <a href="#"><u>ETO Performance ratings</u></a>   | 5  |
| <a href="#"><u>EXO Performance ratings</u></a>   | 9  |
| <a href="#"><u>Dimensions and data</u></a>       | 13 |
| <a href="#"><u>Accessories</u></a>               | 14 |
| <a href="#"><u>Design data</u></a>               | 16 |
| <a href="#"><u>Mechanical specifications</u></a> | 18 |
| <a href="#"><u>Special applications</u></a>      | 19 |
| <a href="#"><u>Warranty</u></a>                  | 20 |

## 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

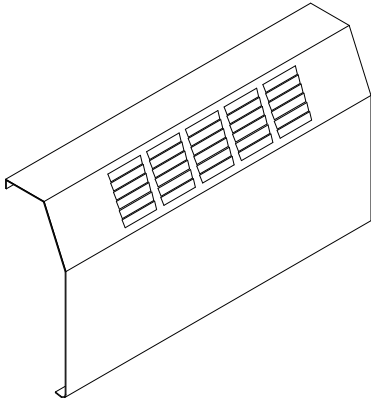
- Tube: 1", 1-1/4" or 2"
  - Fin: 3-1/4" x 3-1/4" or 4-1/4" x 4-1/4"
  - 1' to 12' lengths in 6" increments
- (See our Finned Tube catalog for more information).

#### Hangers:

- Second row bracket, wall mounted.

# Enclosure models

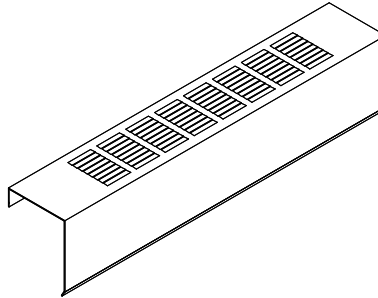
## STEL



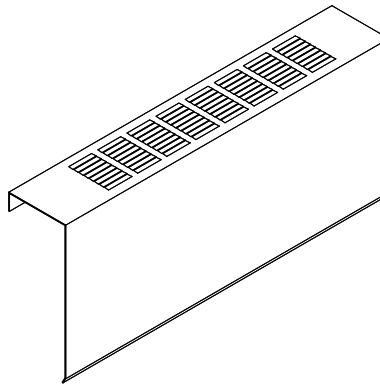
**STEL:**  
Sloped louvered outlet, open inlet

[Performance data, 4](#)  
[Dimensional Data, 13](#)

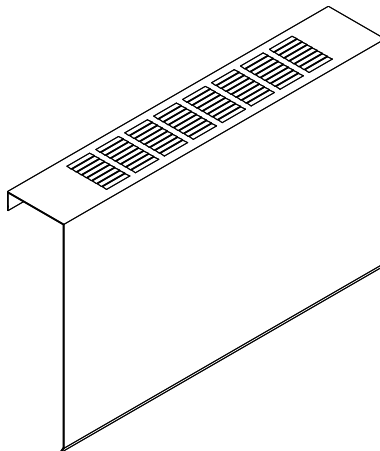
## ETO



**ETO:**  
Top louvered outlet, 1 row high



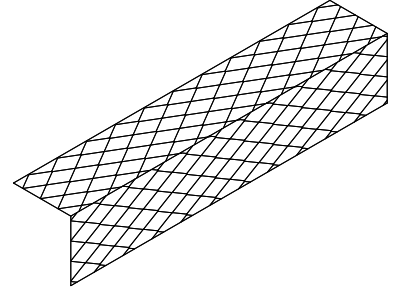
**ETO:**  
Top louvered outlet, 2 rows high



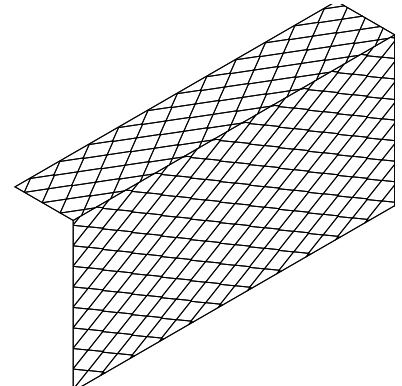
**ETO:**  
Top louvered outlet, 3 rows high

[Performance data, 5-8](#)  
[Dimensional Data, 13](#)

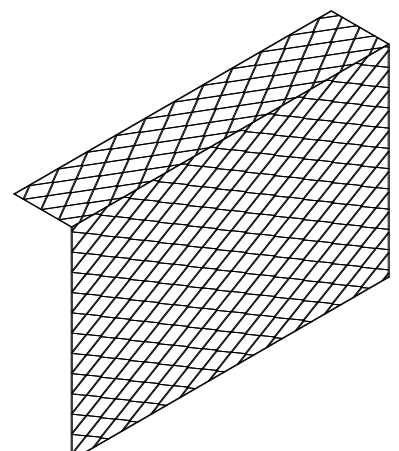
## EXO



**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*<br>(ft2/ ft) | Steam<br>heat              | Hot water heat             |                            |                            |                            |                            |                            |                            |                            |                            |
|-----------------|---------------|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                 |               |                   | 215°F<br>Factor of<br>1.00 | 240°F<br>Factor of<br>1.25 | 230°F<br>Factor of<br>1.14 | 220°F<br>Factor of<br>1.05 | 210°F<br>Factor of<br>0.95 | 200°F<br>Factor of<br>0.86 | 190°F<br>Factor of<br>0.78 | 180°F<br>Factor of<br>0.69 | 170°F<br>Factor of<br>0.61 | 160°F<br>Factor of<br>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

Model ETO

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

| Element       |               | Rows of element<br>(on 6-inch centers) | Enclosure height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft2/ ft) | Steam heat                 | Hot water heat             |                            |                            |                            |
|---------------|---------------|--|---------------------------------|--|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|               |               |  |                                 |  |                   | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>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                                      | 4-5/8                           | 8-5/8  | 4.90              | 1190                       | 930                        | 820                        | 720                        | 630                        |
|               |               | 2                                      | 10-5/8                          | 14-5/8   | 8.30              | 1990                       | 1550                       | 1380                       | 1210                       | 1050                       |
|               |               | 3                                      | 16-5/8                          | 20-5/8   | 9.20              | 2210                       | 1720                       | 1520                       | 1350                       | 1170                       |

\*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<br>(on 6-inch centers) | Enclosure height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft <sup>2</sup> / ft) | Steam heat                 | Hot water heat             |                            |                            |                            |  |
|----------------|----------------|--|---------------------------------|--|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
|                |                |  |                                 |  |                                | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>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<br>(on 6-inch centers) | Enclosure height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft2/ ft) | Steam heat                 | Hot water heat             |                            |                            |                            |
|-------------------------|---------------|--|---------------------------------|--|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                         |               |  |                                 |  |                   | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>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<br>(on 6-inch centers) | Enclosure height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft2/ ft) | Steam heat                 | Hot water heat             |                            |                            |                            |  |
|-------------------------|----------------|--|---------------------------------|--|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
|                         |                |  |                                 |  |                   | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>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<br>(on 6-inch centers) | Enclosure height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft2/ ft) | Steam heat                 | Hot water heat             |                            |                            |                            |  |
|---------------|---------------|--|---------------------------------|--|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
|               |               |  |                                 |  |                   | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>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                                      | 4-1/2                           | 8-1/2  | 5.80              | 1410                       | 1090                       | 970                        | 860                        | 740                        |  |
|               |               | 2                                      | 10-1/2                          | 14-1/2   | 10.20             | 2460                       | 1930                       | 1700                       | 1500                       | 1310                       |  |
|               |               | 3                                      | 16-1/2                          | 20-1/2   | 13.20             | 3170                       | 2470                       | 2190                       | 1940                       | 1680                       |  |

\*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<br>element<br>(on 6-inch<br>centers) | Enclosure<br>height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft2/ ft) | Steam heat                 | Hot water heat             |                            |                            |                            |  |
|-------------------|-------------------------|--|------------------------------------|--|-------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
|                   |                         |  |                                    |  |                   | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>0.53 |  |
| Steel element     |                         |  |                                    |  |                   |                            |                            |                            |                            |                            |  |
| 1 1/4" Dia. steel | 1 1/4S-3 1/4 X 3 1/4-32 | 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                       |  |
|                   | 1 1/4S-3 1/4 X 3 1/4-40 | 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                       |  |
|                   | 1 1/4S-3 1/4 X 3 1/4-48 | 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                       |  |
| 1 1/4" Dia. steel | 1 1/4S-4 1/4 X 4 1/4-32 | 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                       |  |
|                   | 1 1/4S-4 1/4 X 4 1/4-40 | 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                       |  |
|                   | 1 1/4S-4 1/4 X 4 1/4-48 | 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-4 1/4 X 4 1/4-32     | 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-4 1/4 X 4 1/4-40     | 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-4 1/4 X 4 1/4-48     | 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<br>(on 6-inch centers) | Enclosure height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft <sup>2</sup> / ft) | Steam heat                 | Hot water heat             |                            |                            |                            |
|-------------------------|---------------|--|---------------------------------|--|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
|                         |               |  |                                 |  |                                | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>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<br>(on 6-inch centers) | Enclosure height<br>(in inches) | Recommend-<br>ed minimum<br>installed<br>height<br>(in inches) | EDR*<br>(ft <sup>2</sup> / ft) | Steam heat                 | Hot water heat             |                            |                            |                            |  |
|-------------------------|----------------|--|---------------------------------|--|--------------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|--|
|                         |                |  |                                 |  |                                | 215°F<br>factor of<br>1.00 | 190°F<br>factor of<br>0.78 | 180°F<br>factor of<br>0.69 | 170°F<br>factor of<br>0.61 | 160°F<br>factor of<br>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.

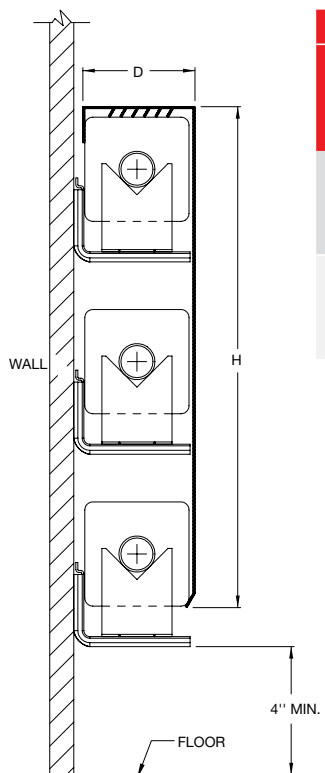
**Important Rating Information** Performance ratings based on:

- 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.)

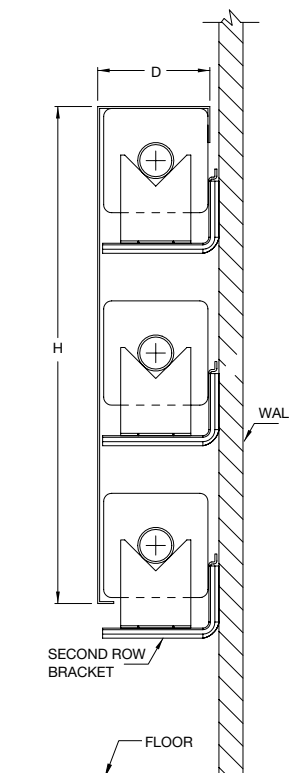
- Steam at nominal 1 (actual 0.9) psig and 215°F. (For other conditions, refer to EZselect selection software.)
- Water average temperature (°F) shown and velocity of 3 fps or more. (For lower velocities, refer to EZselect selection software.)

# Dimensions and data

## ETO, EXO and STEL



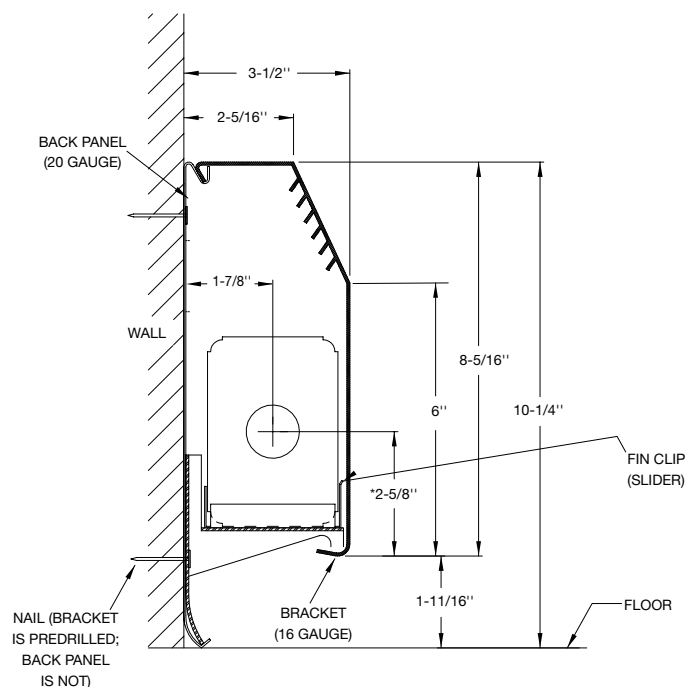
| ETO                        |                     |           |            |
|----------------------------|---------------------|-----------|------------|
| Fin sizes for finned tube* | Rows of finned tube | D (depth) | H (height) |
| 3-1/4" x 3-1/4"            | 1                   | 3-1/2"    | 3-5/8"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

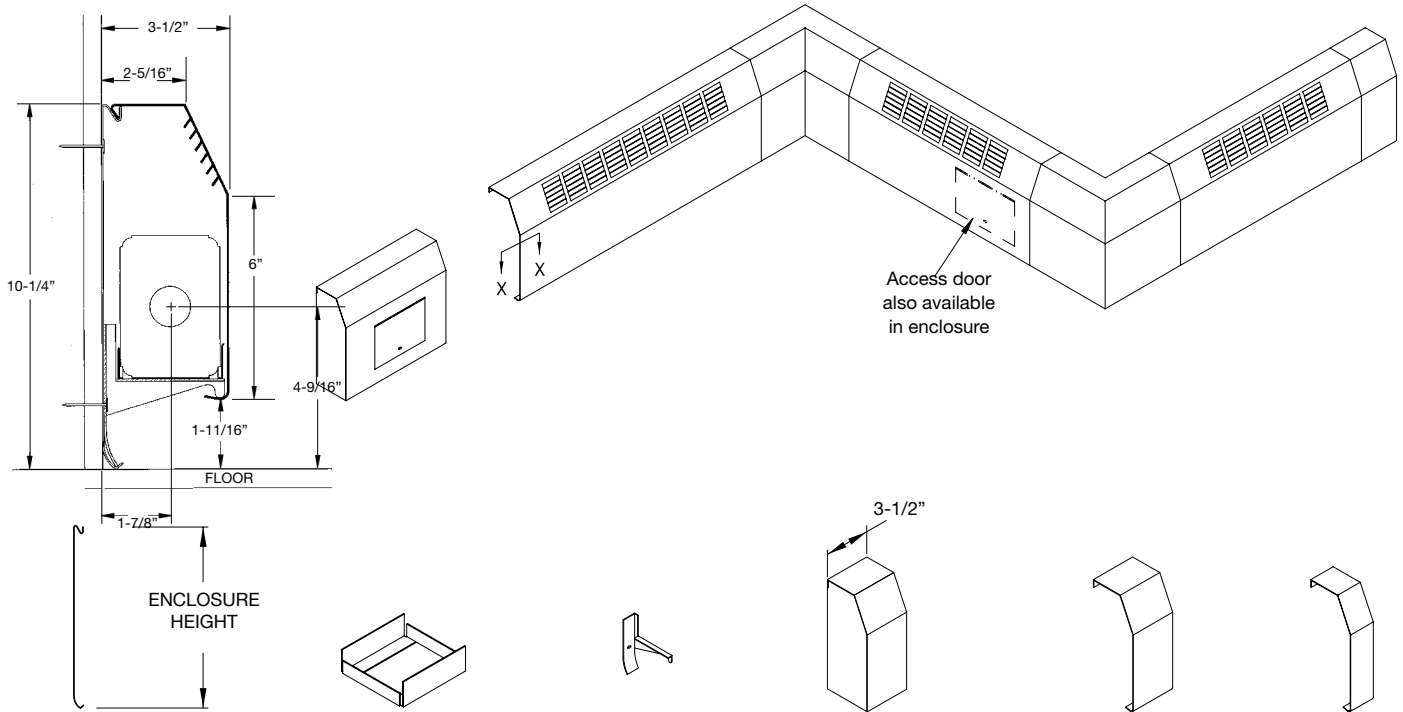
## Sloped economy STEL



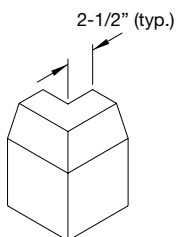
- Notes:
- \*Center lines are based on 1" copper tube.

# Accessories

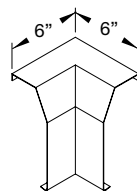
STEL



"STEL-BP"  
Back panel



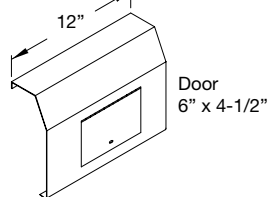
"STEL-AL"  
Element slider



"STELBRKT"  
Element bracket



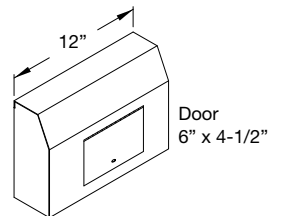
"EC"  
End cap  
(left hand shown)



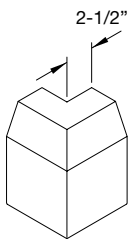
"WT"  
Wall trim strip  
3-1/2", 5", 7-1/2"



"JNR"  
Joining trim  
strip 2"



"OC"  
Outside corner

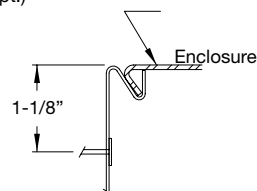


"IC"  
Inside corner



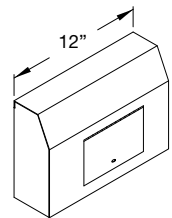
Knob damper

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



Back panel detail

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

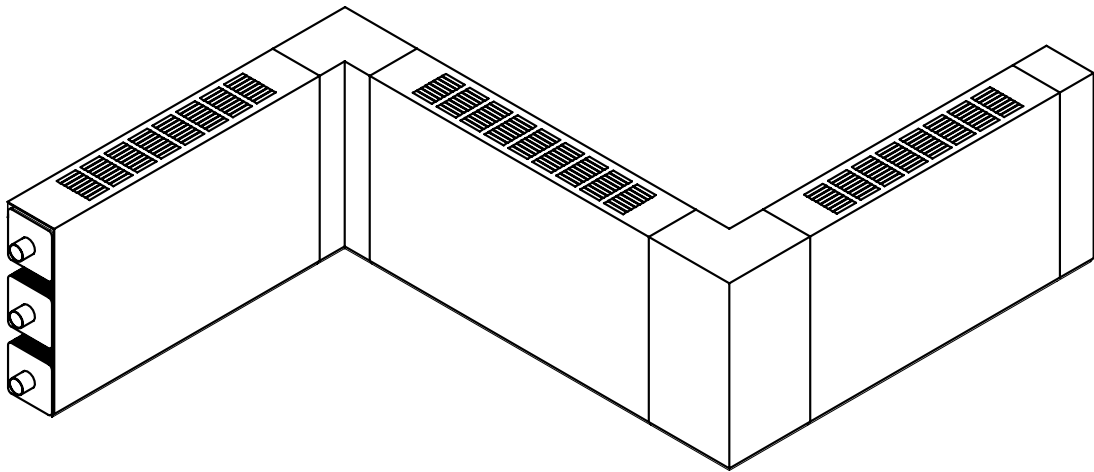




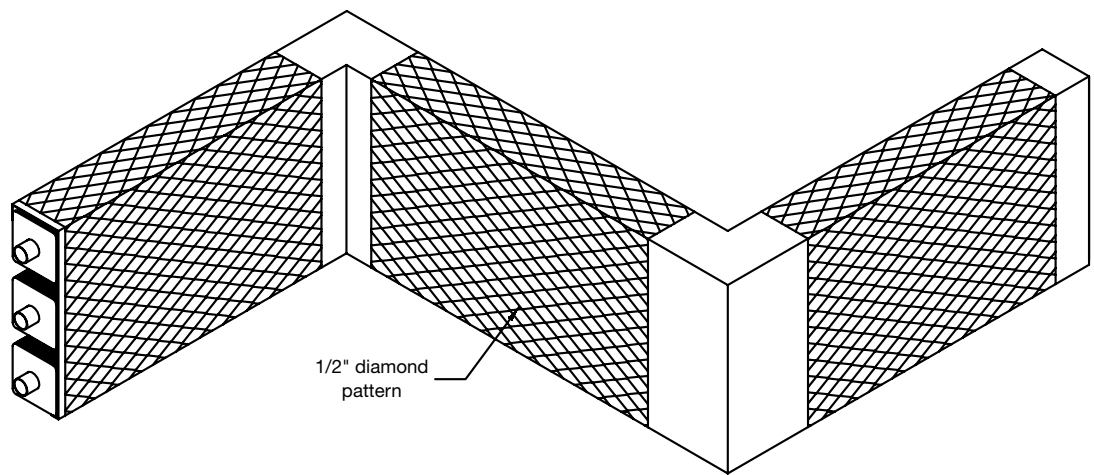
# Accessories

ETO and EXO

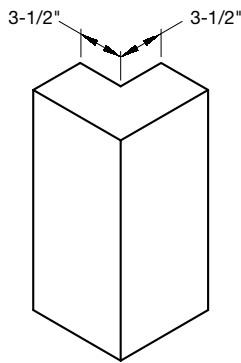
ETO



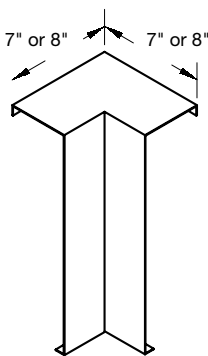
EXO



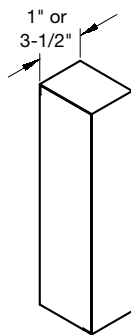
Slip-in  
second row  
bracket



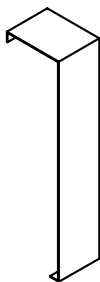
"OC"  
Outside corner



"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<br>Pipe water capacities and quantities<br>circulated at velocity of 3 feet per second* |                                  |                           |                     |
|--|----------------------------------|---------------------------|---------------------|
| Pipe Size  | Gallons<br>per<br>linear<br>foot | Gallons<br>per<br>minute* | Pounds<br>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               |

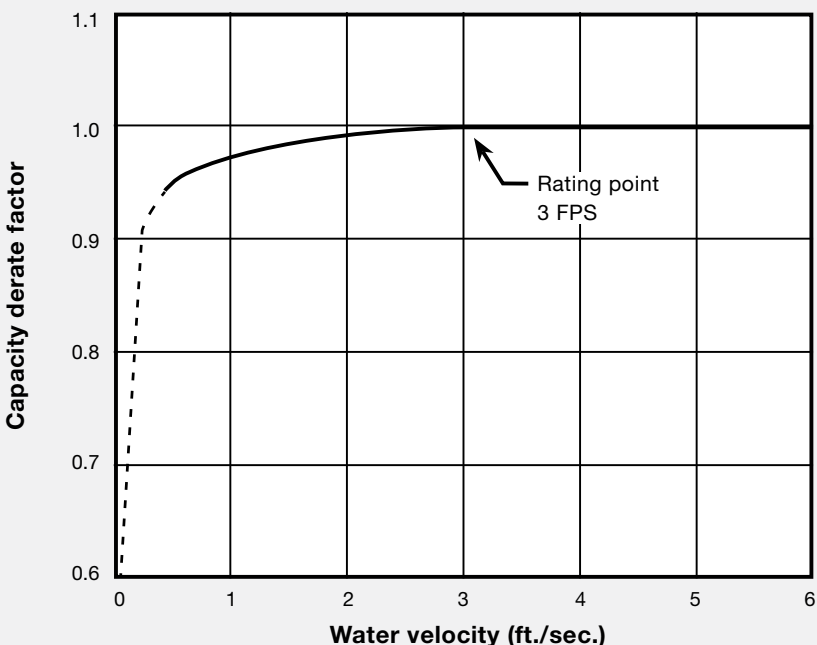
Note:

- \*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

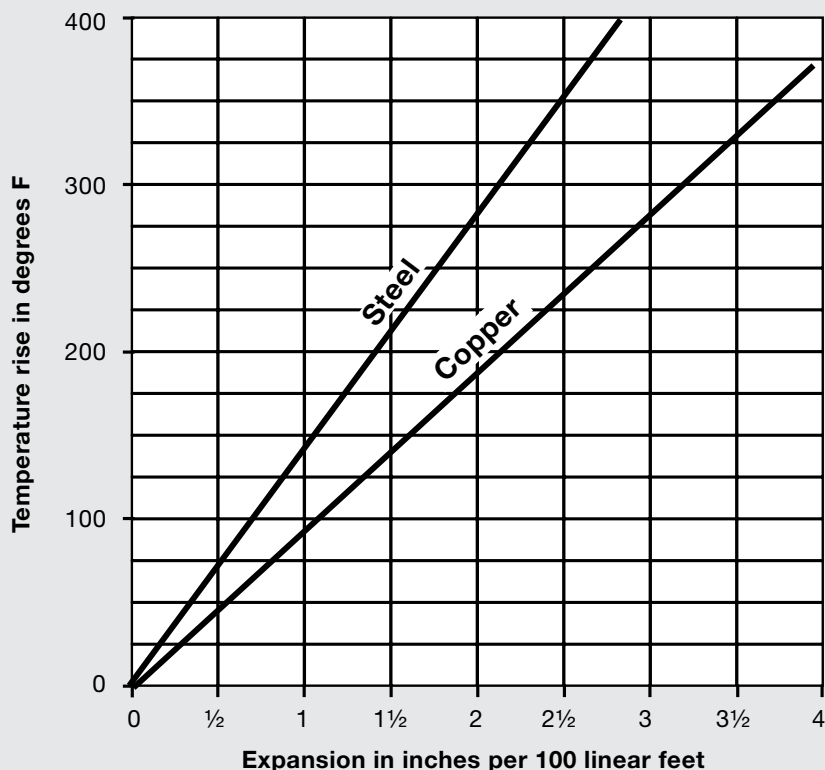
Figure 1  
Effect of Water Velocity on Finned Tube Output



Note:

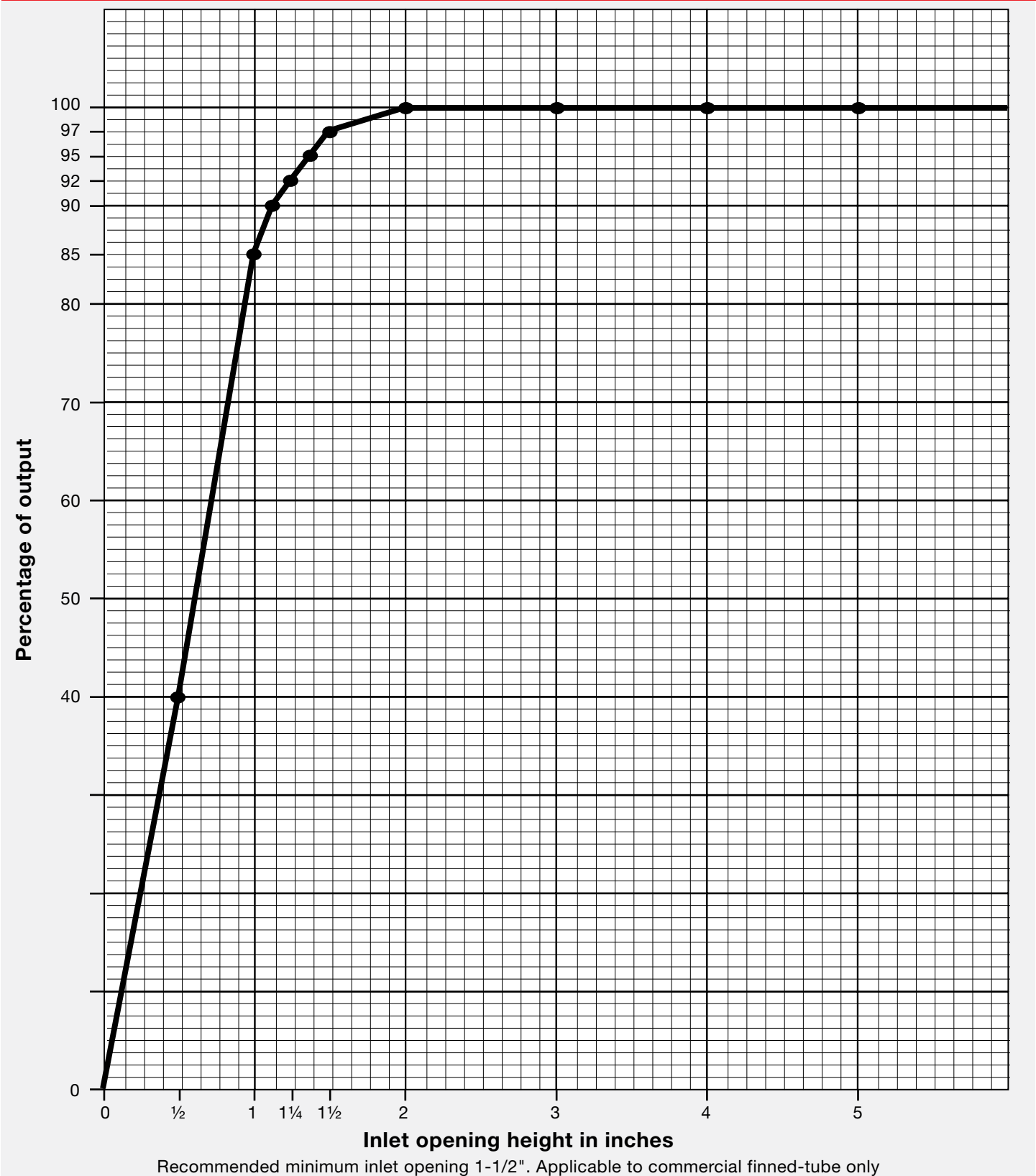
- ---- below critical velocity

Figure 3  
Expansion in steel and copper piping



# Design data

Figure 4 - Inlet vs. output / BTUH capacity reduction



# 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

**1<sup>ST</sup>**

STEEL RADIATOR IN  
THE WORLD

**121**

YEARS OF INNOVATIVE TRADITION

AROUND

**3,000**

EMPLOYEES

FOUNDED IN

**1895**

REPRESENTED IN  
COUNTRIES

**19**

**1,800,000**

TONNES OF CO<sub>2</sub> 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

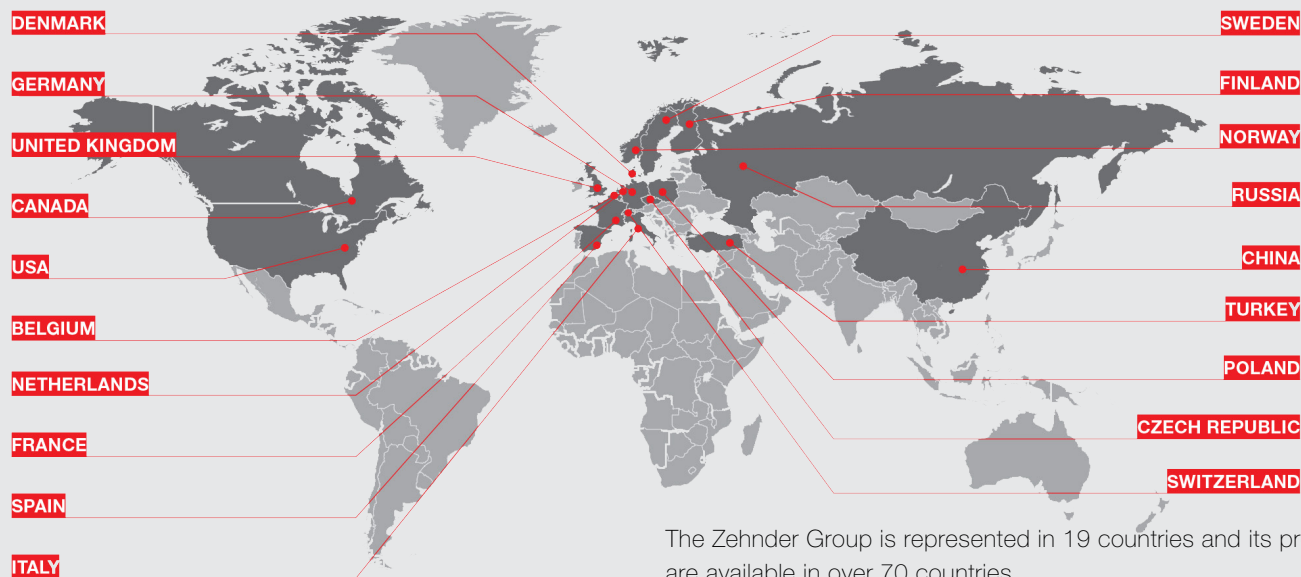
Zehnder heating and cooling ceiling systems are convenient and energy-efficient for heating and cooling. They are perfectly attuned to the relevant environment.



### 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



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.

