Raychem RTB TUBING BUNDLES

This section will help you select and design a complete tubing bundle system for electric heat tracing, steam tracing, or pre-insulated only lines. For other applications or for design assistance, contact your Pentair Industrial Heat Tracing Solutions representative or visit our web site at www.pentairthermal.com.

Contents

INTRODUCTION

Achieve a total solution for heat tracing instrument and small-diameter process lines with Raychem tubing bundles.

Pentair provides a total solution for heat tracing instrument and small-diameter process lines. Raychem brand RTB tubing bundles are a pre-traced and pre-insulated tubing alternative to field tracing and insulating. RTB systems combine Raychem electric or steam heat tracing with tubing and insulation for a single bundle that can be cut to length in the field.

Typical RTB applications include:

- Impulse lines — to flow transmitters, pressure transmitters, level transmitters, and pressure switches
- Sample lines — to analyzers and chromatographs
- Process lines — for steam supply, condensate return, water purge, chemical feed, and air lines

SYSTEM OVERVIEW

An RTB system consists of pre-traced and pre-insulated tubing bundles. Each tubing bundle can be configured as single- or dual-tube, as shown below, and can be constructed in various sizes and materials to meet your small-diameter process needs.

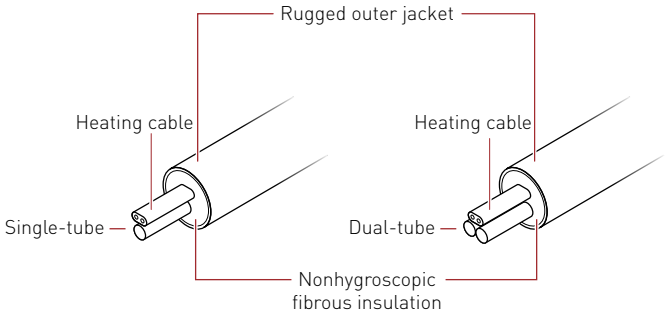


Fig. 1 Tubing bundles, single- and dual-tube construction

Raychem tubing bundles simplify design and significantly reduce installation time.

Raychem RTBs are pre-engineered to ensure consistent and repeatable performance for maintenance-free operation. Compared to field fabrication, they simplify design and significantly reduce installation time. The RTB's unique parallel construction allows for a tight bending radius (down to 8 inch) and eliminates possible tube kinking. Each bundle can be cut to length in the field and is powered and terminated with simple RTB connection kits. The insulating material consists of a nonhygroscopic fibrous glass for maximum heat-loss prevention. Finally, each RTB is encased in a high-performance polyurethane outer jacket that provides superior UV resistance and installation capability to –40°C (–40°F).

Contact your Pentair representative for design assistance for the following applications:

- The desired maintain temperature range or process tube size does not appear in Table 3 on page 8, or Table 4 on page 9
- The ambient temperature range is different than –30°C to 38°C (–20°F to 100°F)
- Supply voltages of 208 Vac or 277 Vac are used
- Temperature control is critical

Approvals and Certifications

Pentair heating cables have agency approvals for use in both nonhazardous and hazardous locations.

The RTB system uses Raychem brand BTV and XTV heating cables that are approved and certified for use in nonhazardous and hazardous locations by many agencies, including FM , CSA, PTB, Baseefa, NEPSI, DNV, ABS and many more. For more details, consult the heating cable data sheets included in the Industrial Heat Tracing Solutions Products & Services Catalogue (H56550) and the Catalogue for Industrial Heat Tracing Products & Services (EN-IndustrialHeatTracingEMEA-SB-DOC2210). Data sheets can be found on the Pentair web site, www.pentairthermal.com.

PRODUCT SELECTION

Overview

The product selection process involves three basic steps:

1. Gather the necessary information.
2. Select the tube type.
3. Select the product / elements based for your application.

Before beginning, take a moment to understand the structure underlying tubing bundle catalog numbers. You will refer to this numbering convention throughout the product selection process. Based on your application: Electric Traced, Steam Traced, or Pre-insulated Only (PIO), your goal is to determine the tubing bundle catalog number for the product that best suits your needs.

Sample applications will be followed throughout the product selection process.

TUBING BUNDLE CATALOG NUMBER

RTB comes in a variety of configurations. The following chart outlines the elements that constitute a bundle configuration and the corresponding catalog number. Other configurations are available on request.

RTB* - X - XXX - X - XXX - XXX-X**

Electric Traced heating options
5B1 = 5BTV1-CT
8B1 = 8BTV1-CT
10B1= 10BTV1-CT
5B2 = 5BTV2-CT
8B2 = 8BTV2-CT
10B2= 10BTV2-CT
5X1 = 5XTV1-CT-T3
10X1 = 10XTV1-CT-T3
15X1 = 15XTV1-CT-T2
20X1 = 20XTV1-CT-T2
5X2 = 5XTV2-CT-T3
10X2 = 10XTV2-CT-T3
15X2 = 15XTV2-CT-T3
20X2 = 20XTV2-CT-T2

Steam Traced heating options
LTS = Low-temperature steam
HTS = High-temperature steam

Preinsulated Only heating option
PIO = Preinsulate only

Process tube wall thickness
030 = 0.030 in
032 = 0.032 in
035 = 0.035 in
049 = 0.049 in
062 = 0.062 in
065 = 0.065 in
10 = 1.0 mm
15 = 1.5 mm

Process tube material
S = Seamless 316 SS
W = Welded 316 SS
M = Monel
C = Copper
P = PFA

Process tubing size
1/8 = 1/8 in
1/4 = 1/4 in
3/8 = 3/8 in
1/2 = 1/2 in
3/4 = 3/4 in
6 = 6 mm
8 = 8 mm
10 = 10 mm
12 = 12 mm

Number of process tubes
1 = Single-tube
2 = Dual-tube

* For optional Arctic PVC jacket add suffix "C" example RTBC
** Requires the selection of tracer tubing, xx = tubing size, -X- tubing, and -XXX- = wall thickness for both LTS and HTS

Examples:
Electric Traced RTB-2-1/2-S-049-10X1
Steam Traced RTB-2-1/2-S-049-LTS-3/8-C-035
Preinsulated Only RTBC-1-1/2-S-049-PIO

Fig. 2 Tubing bundle catalog number elements

Product Selection
1. Gather information
2. Select tube type
3. Select the product / elements

Step 1 Gather the necessary information

First, determine the application that best suits your project, and then go to the respective section that describes the information you will need to gather for that application.

The applications are:

- Electric Traced Lines: For freeze protection and temperature maintenance.
- Steam Traced Lines: For freeze protection and temperature maintenance.
- Pre-insulated Only (PIO) Lines: For steam distribution supply lines, condensate return and personnel protection.

FOR ELECTRIC TRACED LINES

To select the tubing bundle for electric traces lines, gather and record the following information:

- Required number of process tubes (one or two) _____
- Required process tubing size (refer to Table 1 on page 6) _____
- Required process tube material _____
- Required process tube wall thickness _____
- Desired maintain temperature range (for selection of the heating cable) _____
- Service voltage for the heating cable _____
- Process operating temperature (for selection of the appropriate materials and heating cable) _____
- Maximum exposure temperature (for selection of the appropriate materials and heating cable) _____
- Temperature class (T-rating) for applications in hazardous locations (for heating cable selection) _____
- Jacket material (see RTB Electric Traced Bundles data sheet [H58179] for options) _____

Example: Electric Traced sample application

Number of process tubes	2
Process tubing size	1/2 inch
Process tube material	Stainless steel 316 (seamless)
Process tube wall thickness	0.049 inch
Maintain temperature	10°C (50°F)
Service voltage for heating cable	120 V
Process operating temperature	38°C (100°F)
Maximum exposure temperature	65°C (150°F)
T-rating	T6
Jacket material	Standard TPU

FOR STEAM TRACED LINES

To select the tubing bundle for steam traced lines, gather and record the following information:

- Required number of process tubes (one or two) _____
- Required process tubing size (refer to Table 1 on page 6) _____
- Required process tube material _____
- Required process tube wall thickness _____
- Desired maintain temperature range _____
- Steam pressure _____
- Steam tracing tubing size, material and wall thickness _____
- Process operating temperature _____
- Maximum exposure temperature _____
- Jacket material (see RTB Steam Traced Bundles data sheet [H58209] for options) _____

Example: Steam Traced sample application

Number of process tubes	2
Process tubing size	1/2 inch
Process tube material	Stainless steel 316 (seamless)
Process tube wall thickness	0.049 inch
Maintain temperature	10°C (50°F)
Steam pressure	2 Bar (15 psig)
Steam tracing tubing size	3/8 inch
Steam tracing tubing material	Copper
Steam tracing wall thickness	0.032 in
Process operating temperature	38°C (100°F)
Maximum exposure temperature	65°C (150°F)
Jacket material	Standard TPU

FOR PRE-INSULATED ONLY (PIO) LINES

To select the tubing bundles for pre-insulated only (PIO) lines, gather and record the following information:

- Required number of process tubes (only one available) _____
- Required process tubing size (refer to Table 1 on page 6) _____
- Required process tube material _____
- Required process tube wall thickness _____
- Process operating temperature _____
- Maximum exposure temperature _____
- Jacket material (see RTB Pre-insulated Only (PIO) Tubing data sheet [H58210] for options) _____

Example: Pre-insulated Only sample application

Number of process tubes	1
Process tubing size	1/2 inch
Process tube material	Stainless steel 316 (seamless)
Process tube wall thickness	0.049 inch
Process operating temperature	38°C (100°F)
Maximum exposure temperature	65°C (150°F)
Jacket material	Optional Artic PVC

Product Selection
1. Gather information
2. Select tube type
3. Select the product / elements

Step 2 Select the tube type

FOR ELECTRIC, STEAM AND PRE-INSULATED ONLY (PIO) LINES

The table that follows lists possible RTB combinations of tube size and wall materials. For other configurations, contact your Pentair representative.

TABLE 1 RAYCHEM TUBING BUNDLE OPTIONS

	Tubing size (nominal)							
	1/8"	1/4"	3/8"	1/2"	6 mm	8 mm	10 mm	12 mm
Tubing wall material and thickness								
Stainless steel 316 (seamless)								
0.035"	•	•	•	•				
0.049"				•				
0.065"				•				
1.0 mm					•	•	•	•
1.5 mm								•
Stainless steel 316 (welded)								
0.035"		•	•	•				
Monel 600 (seamless)								
0.035"		•	•					
0.049"				•				
Copper								
0.030"		•						
0.032"			•					
0.049"				•				
1.0 mm					•	•	•	•
PFA Teflon								
0.030"		•	•					
0.060"				•				
1.0 mm					•	•		

Example: Electric Traced tube number / size / material selection

Number of process tubes	2 (from Step 1)
Process tubing size	1/2 inch (from Step 1)
Process tube material	Stainless steel 316 (seamless) (from Step 1)
Process tube wall thickness	0.049 inch (from Step 1)
Catalog number	RTB-2-1/2-S-049-XXXX

Selection of the heating cable will fill in the one element missing from the catalog number of your Raychem brand RTB tubing bundle.

Product Selection
1. Gather information
2. Select tube type
3. Select the product / elements

Step 3 Select the product / elements for your application

FOR ELECTRIC TRACED LINES

Raychem RTB Electric Traced tubing bundles are available with Raychem brand BTV and XTV heating cables. Use BTV heating cables for maintain temperatures up to 32°C (90°F). For higher maintain temperatures or exposure temperatures above 85°C (185°F), use XTV heating cables. Use Table 2 to identify the cable family that meets your maximum continuous and intermittent temperatures. For maintain and exposure temperatures that exceed the maximum for BTV and XTV, contact your Pentair representative.

For more detailed heating cable information, please refer to the Self-Regulating Cables design guide (H56882) of the Industrial Heat Tracing Solutions Products & Services Catalogue (H56550) and the Catalogue for Industrial Heat Tracing Products & Services(EN-IndustrialHeatTracingEMEA-SB-DOC2210).

TABLE 2 OVERVIEW OF BTV AND XTV HEATING CABLE CHARACTERISTICS

Heating cable	Service voltage	Maximum continuous exposure temperature*	Maximum intermittent exposure temperature **	T-rating/ maximum sheath temperature***
BTV1 all types	110/120 Vac	65°C (150°F)	85°C(185°F)	T6 85°C (185°F)
BTV2 all types	208/277 Vac	65°C (150°F)	85°C(185°F)	T6 85°C (185°F)
5XTV1, 10XTV1	110/120 Vac	121°C (250°F)	250°C(482°F)	T3 200°C (392°F)
15XTV1	110/120 Vac	121°C (250°F)	250°C(482°F)	T2D 215°C (419°F)
5XTV2, 10XTV2, 15XTV2	208/277 Vac	121°C (250°F)	250°C(482°F)	T3 200°C (392°F)
20XTV1	110/120 Vac	121°C (250°F)	250°C(482°F)	T2C 230°C (446°F)
20XTV2	208/277 Vac	121°C (250°F)	250°C(482°F)	T2C 230°C (446°F)

* Heating cable power on (= maximum maintain temperature)
** For 1000 hours intermittent (power on or off)
*** Higher maximum sheath temperatures have been approved by other agencies
Note: All heating cables have a fluoropolymer outer jacket (CT)

Example: Electric Traced selection

Service voltage for heating cable	120 V (from Step 1)
Process operating temperature	38°C (100°F) (from Step 1)
Maximum exposure temperature	65°C (150°F) (from Step 1)
Appropriate heating cable	BTV1

Expected maintain temperature range

Table 3 provides the minimum and maximum expected maintain temperatures of the tubing bundle for ambient temperatures ranging from –30°C to 38°C (–20°F to 100°F).

Go to the column with the tube size you selected and find the heating cable(s) that will maintain the tubing bundle at your minimum temperature requirement or higher. If more than one heating cable will maintain your application's temperature range, choose the cable with the lowest maximum temperature. A thermostat should be used if the maximum temperature in the table exceeds the maximum desired value. Note the heating cable type and the temperature range.

TABLE 3 PROCESS TUBE MAINTAIN TEMPERATURES (MINIMUM–MAXIMUM) FOR AMBIENT RANGE OF –30°C TO 38°C (–20°F TO 100°F) AT 120/240 V

	6 mm or 1/4 in		8 mm		3/8 in		10 mm		12 mm or 1/2 in	
Size	**°C**	**(°F)**	**°C**	**(°F)**	**°C**	**(°F)**	**°C**	**(°F)**	**°C**	**(°F)**
Single-tube										
5BTV1 and 2	19–52	(66–126)	18–52	(64–125)	16–51	(61–124)	15–51	(60–123)	14–50	(58–122)
8BTV1 and 2	32–58	(90–136)	31–57	(88–135)	29–57	(85–134)	28–56	(83–134)	27–56	(81–133)
5XTV1 and 2	31–92	(87–197)	28–90	(82–194)	26–88	(78–190)	23–87	(74–189)	21–84	(70–184)
10XTV1 and 2	63–110	(145–231)	60–108	(139–226)	56–105	(133–222)	53–105	(128–220)	51–101	(123–214)
15XTV1 and 2	84–126*	(184–250)*	81–123*	(177–250)*	78–120	(172–248)	77–120	(170–247)	71–116	(161–240)
20XTV1 and 2	111–151*	(232–250)*	107–148*	(224–250)*	103–145*	(217–250)*	102–144*	(215–250)*	96–139*	(204–250)*
Dual-tube										
5BTV1 and 2	18–52	(64–125)	16–51	(61–124)	14–50	(58–122)	13–49	(56–121)	12–49	(53–120)
8BTV1 and 2	32–58	(89–136)	30–57	(86–135)	28–56	(82–133)	26–56	(79–132)	24–55	(76–131)
5XTV1 and 2	29–91	(85–196)	25–88	(77–190)	22–85	(71–184)	19–84	(66–183)	16–80	(60–176)
10XTV1 and 2	61–109	(142–228)	56–105	(133–221)	52–102	(125–215)	48–101	(119–213)	44–96	(112–205)
15XTV1 and 2	83–124*	(181–250)*	77–119	(171–247)	73–116	(162–241)	71–115	(160–240)	64–110	(148–230)
20XTV1 and 2	109–149*	(228–250)*	102–144*	(216–250)*	97–140*	(206–250)*	95–139*	(203–250)*	87–132*	(189–250)*

The temperatures included in Table 3 are for approximation. For critical services applications contact your Pentair representative.
* Requires overtemperature line-sensing thermostat to ensure operation below maximum continuous exposure temperature.

Example: Electric Traced selection

Number of process tubes	2 (from Step 1)
Process tubing size	1/2 inch (from Step 1)
Process tube material	Stainless steel 316 (seamless) (from Step 1)
Process tube wall thickness	0.049 inch (from Step 1)
Maintain temperature	10°C (50°F) (from Step 1)
Service voltage	120 V (from Step 1)
Selected heating cable type	5BTV1 (from previous page)
Min./max. temperature from table	18°C to 51°C (64°F to 125°F) (from Table 3)
Catalog number	RTB-2-1/2-S-049-5B1 (RTB-2-1/2-S-049 is derived from Step 2)

FOR STEAM TRACED LINES

Raychem RTB Steam Traced tubing bundles are designed to use steam as a heating medium. The performance of each type of product is dictated by construction and positioning of the insulation with the finished product.

Light Traced Steam (LTS) applications are constructed by separately insulating the tracer tubing and creating a fixed separation from the process tube(s). The resulting performance characteristics allow LTS to be ideal for freeze protection of small diameter process lines such as instrument impulse lines and can maintain temperatures up to 95°C (200°F).

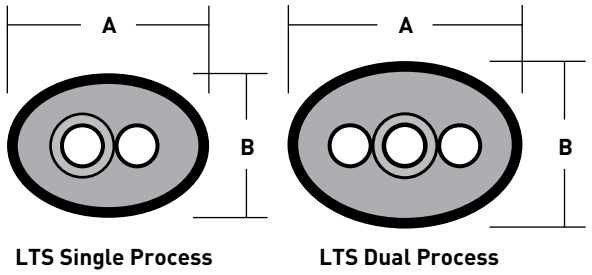


Fig. 3 Light Traced Steam (LTS)

Heavy Traced Steam (HTS) applications are constructed with intimate contact between the tracer tubing and process tube(s). This construction allows for maximum transfer of heat between the tubes and is ideal for higher maintain applications such as analyzer sample transport and small diameter process lines containing product where temperature maintenance or viscosity control is necessary.

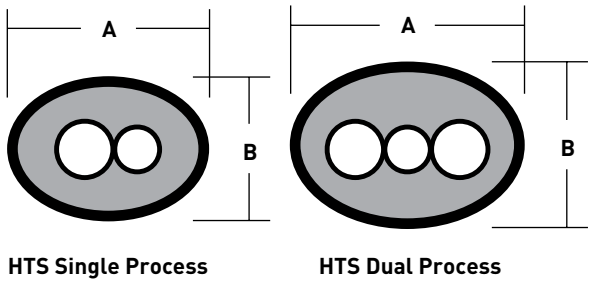


Fig. 4 Heavy Traced Steam (HTS)

TABLE 4 PROCESS TUBE MAINTAIN TEMPERATURES (MINIMUM–MAXIMUM) FOR AMBIENT RANGE OF –30°C TO 38°C (–20°F TO 100°F)

	2 Bar (15 psig)		4.4 Bar (50 psig)		9.6 Bar (125 psig)	
	°C	(°F)	°C	(°F)	°C	(°F)
LTS w/ One 1/2" process tube						
3/8" Tracer	17–65	(62–143)	26–74	(78–165)	35–84	(95–193)
1/2" Tracer	29–71	(84–159)	39–83	(102–181)	51–95	(123–203)
LTS w/ Two 1/2" process tubes						
3/8" Tracer	17–65	(62–143)	26–74	(78–165)	35–84	(95–193)
1/2" Tracer	29–71	(84–159)	39–83	(102–181)	51–95	(123–203)
HTS w/ One 1/2" process tube						
3/8" Tracer	118–119	(244–246)	145–146	(293–294)	175–176	(347–348)
HTS w/ Two 1/2" process tubes						
3/8" Tracer	118–119	(244–246)	145–146	(293–294)	175–176	(347–348)

The preceding performance data is typical. Considerations regarding various ambient conditions and maximum run length need to be taken into consideration when selecting tracer size and pressure.

For additional data on performance and run lengths refer to RTB Steam Traced Bundles data sheet (H58209) or contact Pentair.

Example: Steam Traced selection

Number of process tubes	2 (from Step 1)
Process tubing size	1/2 inch (from Step 1)
Process tube material	Stainless steel 316 (seamless) (from Step 1)
Process tube wall thickness	0.049 inch (from Step 1)
Maintain temperature	10°C (50°F) (from Step 1)
Steam pressure	2 Bar (15 psig) (from Step 1)
Steam tracing tubing size	3/8 (from Step 1)
Steam tracing tubing material	Copper (from Step 1)
Steam tracing wall thickness	0.032 inch (from Step 1)
Process operating temperature	38°C (100°F)
Maximum exposure temperature	65°C (150°F)
Catalog number	RTB-2-1/2-S-049-LTS-3/8-C-032

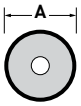
FOR PRE-INSULATED ONLY (PIO) LINES

Raychem RTB Pre-insulated Only (PIO) tubing bundles are designed specifically for liquid and gas transport lines. These products are used where heat loss, weatherproofing, and personnel protection are important. These are an inexpensive and faster alternative to field insulation of small diameter process lines.

Typical usage includes not only liquid and gas transport lines, but also steam supply lines, condensate return lines, energy conservation, weatherproofing, and personnel protection. Temperature limit is a maximum process temperature: 204°C (400°F). Maximum jacket surface temperature is: 60°C (140°F) @ 27°C (80°F) with 16 km/h (10 mph) wind. Minimum recommended slope for steam line condensate run-off is 1/4 inch per foot.

TABLE 5 INSTALLATION AND DETAILS

	Minimum bend radius cm (in)		Support centers m (ft) Horizontal		Support centers m (ft) Vertical		Nominal weight kg/m (lb/ft)		Nominal dimensions "A" cm (in)	
One 1/4" process line	20	(8)	1.8	(6)	4.6	(15)	0.30	(0.2)	2.5	(1.0)
One 3/8" process line	20	(8)	1.8	(6)	4.6	(15)	0.45	(0.3)	3.2	(1.2)
One 1/2" process line	20	(8)	1.8	(6)	4.6	(15)	0.60	(0.4)	3.4	(1.3)



Example: Pre-insulated Only selection

Number of process tubes	1 (from Step 1)
Process tubing size	1/2 inch (from Step 1)
Process tube material	Stainless steel 316 (seamless) (from Step 1)
Process tube wall thickness	0.049 inch (from Step 1)
Process operating temperature	38°C (100°F)
Maximum exposure temperature	65°C (150°F)
Catalog number	RTBC-1-1/2-S-049-PIO

BILL OF MATERIALS

The creation of a bill of materials involves three basic steps:

1. Determine the total length of tubing bundle and heating cable.
2. Determine the circuit breaker trip rating for bundle.
3. Determine the type and quantity of connection kits, accessories and controllers.

Bill of Materials
1. Determine length of bundle and cable
2. Determine trip rating
3. Select components, accessories and controllers

Step 1 Determine the total length of tubing bundle and heating cable

For electric applications, the length of the heating cable is typically identical to the required length of the tubing bundle. For all applications, be sure the length you order includes an additional one meter (three feet) for each power connection and end seal.

Bill of Materials
1. Determine length of bundle and cable
2. Determine trip rating
3. Select components, accessories and controllers

Step 2 Determine circuit breaker trip rating for bundle

Determine the maximum heating cable length permitted on one circuit breaker. Tables 8 and 9 in the Self-Regulating Cables design guide (H56882) show the maximum heating cable length that may be powered from different-sized circuit breakers for different start-up temperatures. For designs based on European approvals, refer to the "Technical databook" Europe now called Catalogue for Industrial Heat Tracing Products & Services (EN-IndustrialHeatTracingEMEA-SB-DOC2210).

If the length of your tubing bundle exceeds the maximum circuit length, either increase the rating of the circuit breaker or split the bundle into several circuits.

Note: Pentair and national electrical codes require ground-fault equipment protection to provide maximum safety and protection from fire.

⚠ WARNING: Fire hazard
There is a danger of fire from sustained electrical arcing if the heating cable is damaged or improperly installed. To comply with Pentair requirements, certifications, and national electrical codes, and to protect against the risk of fire, ground-fault equipment protection must be used on each heating cable circuit. Arcing may not be stopped by conventional circuit breakers.

Example: Circuit breaker trip rating determination

Catalog number	RTB-2-1/2-S-049-5B1 (from Product Selection, Step 3)
Heating cable type	5BTV1 (from Product Selection, Step 3)
Tubing bundle length	46 m (150 ft)
Start-up temperature	0°C (32°F) Default
Circuit breaker size	15 A
Maximum circuit length	42 m (140 ft)
Number of circuits	2

Bill of Materials
1. Determine length of bundle and cable
2. Determine trip rating
3. Select components, accessories and controllers

Step 3 Determine the type and quantity of the connection kits, accessories and controllers

Now that you have determined your circuit-breaker rating and number of circuits, use Table 6 on page 12 to determine the number of connection kits and accessories required. Raychem BTV and XTV heating cables must be connected and terminated with appropriate power connection and end seal kits (see figure below).

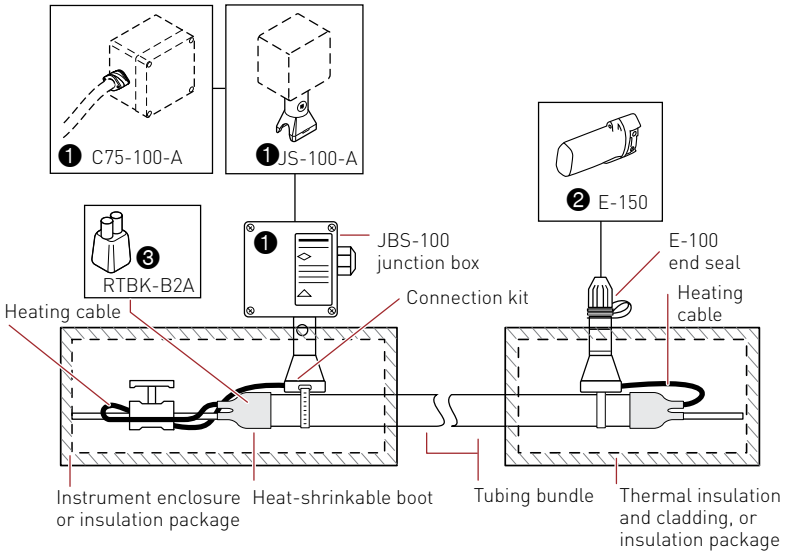


Fig. 5 Tubing bundle connection kits

⚠ WARNING: Fire hazard
To prevent fire or shock, Raychem brand specified connection kits must be used. Do not substitute parts or use vinyl electrical tape.

TABLE 6 RTB CONNECTION KITS AND ACCESSORY QUANTITIES REQUIRED

Description	Catalog number	Quantity
Connection kits for heating cables		
Power connection kits		1 per circuit
Single entry power connection	JBS-100	
Junction box stand	JS-100	
Gland connection	C75-100-A / C25-100	
End seals*		1 per circuit
End seal, above insulation	E-100	
End seal, with light	E-100-L	
End seal kit (low profile)	E-150	
Splice kits (not shown)	S-150, T-100	As required
Tubing bundle accessories		
Heat-shrinkable boots		1 per connection kit
Boot for single tube	RTB-RTBK-B1A	
Boot for single tube with electric trace	RTB-RTBK-B2A	
Boot for dual tubes with electric trace	RTB-RTBK-B3A	
Heat-shrinkable enclosure entry seal (not shown)		1 per enclosure entry
Entry seal for single and dual tubes from 1/8"–3/8" (6mm–10 mm) and 1/2" (12 mm) single tubes	RTB-RTBK-CES4	
Entry seal for 1/2" (12 mm) dual tubes	RTB-RTBK-CES5	
Other		As required
Jacket patch kit	RTB-TPKJP-1	
Silicone sealant	RTB-TPKSK-10	

TABLE 7 AVAILABLE SYSTEM COMPONENTS, ACCESSORIES AND CONTROLLERS

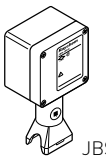
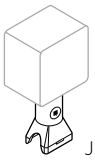
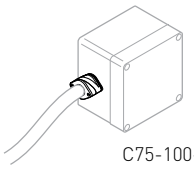
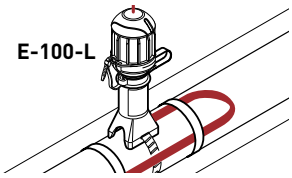
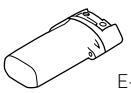
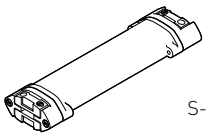
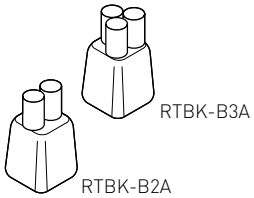
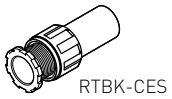
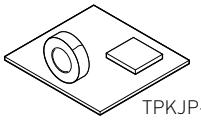
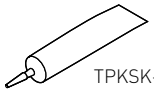
System Components	Power Connection Kits for Heating Cable	Electric Traced	Steam Traced	Pre-insulated Only
 JBS-100	**JBS-100** Power connection for one heating cable in nonhazardous, Zone 1, 2 and Division 2 hazardous locations. Includes cold-applied heating cable core seal. Requires one pipe strap to be ordered separately. For North America approvals: (H56827) JBS-100-A, JBS-100-L-A (with red indicator light) For ATEX Certifications: (DOC 2210) JBS-100-E, JBS-100-EP (with internal earth plate), JBS-100-L-E (with green indicator light), JBS-100-L-EP (as above with earth plate)	☑		
 JS-100-A	**JS-100-A** (H56450) Junction box stand for one heating cable in nonhazardous and Division 2 hazardous locations. A separate customer-supplied NEMA 4X junction box is required. Includes cold-applied heating cable core seal. Requires one pipe strap to be ordered separately.	☑		
 C75-100-A	**C75-100-A** (North America: H56343) **C25-100** (European: DOC 2210) A gland kit used to transition heating cables into a junction box in nonhazardous and hazardous locations. Includes cold-applied heating cable core seal. A terminal block (3 x 12 AWG) is included. This kit does not include the junction box or the conduit.	☑		
 E-100-L	**End Seal Kits for Heating Cable** **E-100** End seal for heating cable in nonhazardous, Zone 1, 2 and Division 2 hazardous locations. Re-enterable. Includes cold-applied heating cable core seal. Requires one pipe strap to be ordered separately. Lighted versions for ease of status monitoring are available. For North America approvals: (H56829) E-100-A, E-100-L-A (with red indicator light, 100-120 V), E-100-L-A (with red indicator light, 200-277 V) For ATEX Certifications: (DOC 2210) E-100-E, E-100-L-E (with green indicator light, 200-277 V)	☑		
 E-150	**E-150** (North America: H56835); (European: DOC 2210) Low-profile end seal for heating cable in nonhazardous, Zone 1, 2 and Division 2 hazardous locations. Includes cold-applied heating cable core seal.	☑		

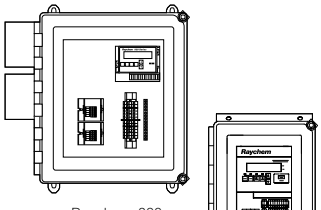
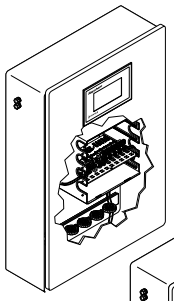
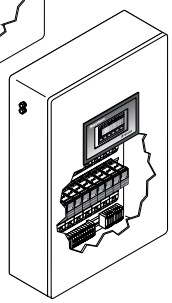
TABLE 7 AVAILABLE SYSTEM COMPONENTS, ACCESSORIES AND CONTROLLERS

		Electric Traced	Steam Traced	Pre-insulated Only
 S-150	**Splice Kits for Heating Cable** **S-150** (North America: H56835); (European: DOC 2210) Splice kit for two heating cables in nonhazardous, Zone 1, 2 and Division 2 hazardous locations. Includes cold-applied heating cable core seal. Consult the data sheets in the Technical Data section for more specific information. For attachment and other accessories for the heating cables, please refer to Self-Regulating Cables of the Industrial Heat Tracing Solutions Products & Services Catalogue (H56550) and the Technical Databook for Industrial Heat-Tracing Systems (DOC 2210).	☑		
Accessories				
 RTBK-B3A RTBK-B2A	**Heat-Shrinkable Boots** Used for sealing bundle ends. The boots are designed to provide a weatherproof seal at the end of the tubing bundles. These boots may be used on all electric-traced bundles. For steam-traced bundles, use silicone sealant (TPKSK-10). Use RTBK-B2A for single-tube bundles with electrical heat tracing Use RTBK-B3A for dual-tube bundles with electrical heat tracing **Important:** Although RTB uses a nonhygroscopic thermal insulation, all bundle ends and jacket penetrations must be sealed to keep the insulation from getting wet.	☑	☑	☑
 RTBK-CES	**Heat-Shrinkable Entry Seals** May be used to provide a waterproof fitting where the bundle enters an enclosure or penetrates a bulkhead. The thermally stabilized, modified polyolefin entry seal includes an O-ring assembly that seals at the enclosure, and a heat-shrinkable nose that seals to the bundle.	☑	☑	☑
 TPKJP-1	**Jacket Patch Kits** Must be used for sealing around line-sensing thermostat entries. The kit contains thermal insulation, fiberglass tape to hold the insulation in place, and a black, self-sealing rubber patch for weatherproofing the bundle.	☑	☑	☑
 TPKSK-10	**Silicone Sealant** A black silicone RTV sealant used for sealing the ends of the tubing bundle from moisture. Cure time is approximately 24 hours at 25°C (77°F). The 10-ounce (280 g) tube will seal approximately 10 bundle ends. Silicone sealant can be used for either electric or steam-traced bundles.	☑	☑	☑

Heat-Shrinkable Sizing Criteria

Tubing size in inches (mm)	Single-tube bundle	Dual-tube bundle
1/4"–3/8" (6–10 mm)	RTBK-CES4	RTBK-CES4
1/2" (12 mm)	RTBK-CES4	RTBK-CES5

TABLE 7 AVAILABLE SYSTEM COMPONENTS, ACCESSORIES AND CONTROLLERS

		Electric Traced	Steam Traced	Pre-insulated Only
	**Electric Traced Label** Attach the label to the outside of the thermal insulation weather barrier to indicate presence of electrical heat tracing. Use one label for every 3 meters (10 ft) of pipe, alternating on either side of the pipe. Also, available in other languages. Refer to the Technical Databook for Industrial Heat-Tracing Systems (DOC 2210) for details.	☑		
Controllers  Raychem 920 Raychem 910  Raychem NGC-30 system  Raychem NGC-40 system	RTB can be operated uncontrolled or with temperature controls that you are using for other heat-tracing applications. Temperature control will be necessary if the maximum value of the temperature range determined in Step 2 exceeds the maximum maintain temperature for the heating cable. For more detail, see the Control and Monitoring design guide design guide (H56889) in the Industrial Heat Tracing Solutions Products & Services Catalogue (H56550) and the Catalogue for Industrial Heat Tracing Products & Services (EN-IndustrialHeatTracingEMEA-SB-DOC2210).	☑		

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