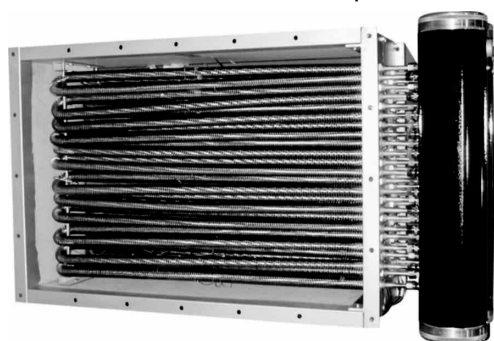


# Explosion-Proof Duct Heaters - Type RXDF

Ruffneck™ type RXDF duct heaters are designed for heating air or gases which contain potentially explosive substances. RXDF heaters feature the unique Ruffneck™ approach to explosion-proof electric heater design which embodies safety, reliability and economy.

The RXDF is a factory pre-wired explosion-proof duct heater. Standard models are available in three duct sizes, with either a single or double bank of heating modules. RXDF heaters are available as standard units with T2D, T3A or T3B hazardous area temperature codes.



IN CANADA THESE UNITS ARE MARKETED UNDER THE CALORITECH™ BRAND NAME. REFER TO CALORITECH™ CATALOGUE SECTION C.

## Construction

The RXDF explosion-proof duct heater utilizes heavy walled carbon steel finned tubular elements with nickel plated finish to provide safe, efficient, low temperature heat transfer. Standard units have a painted steel duct with mounting holes provided for attachment to the duct section.

RXDF heaters feature the unique copper free aluminum extruded **x-Max**® terminal housing (U.S. Pat. No. 5,798,910, CDN. Pat. No. 2,212,500). A track and trolley system and threaded covers at each end allow easy access to wiring terminal connections. Units are approved for mounting in a horizontal duct section.



## Wattage

Units are available in wattages up to 50 kW.

## Designed for Application in Hazardous Environments, such as:

- oil refineries
- coal mines
- pulp and paper mills
- petrochemical plants
- grain elevators
- sewage treatment plants

## Control Panels

For information on control panels please contact the factory.

## Thermostats

CCI Thermal Technologies Inc. offers a wide variety of explosion proof thermostats to suit most every need. All model RXDF heaters are available with remote externally adjustable thermostats which are field convertible to tamper-proof.

## Heater Selection

Standard Ruffneck™ RXDF duct heaters may be operated in hazardous areas where the ambient temperature does not exceed 40°C (104°F) and the maximum heater surface temperature does not exceed the temperature code rating. Use the following steps for heater selection.

1. Determine the class, divisions, and group required.
2. **Determine temperature code rating.** Standard heaters are available for T2D, T3A or T3B areas.
3. **Determine kW rating.** Standard heaters are available up to 50 kW.
4. **Determine duct size.** Three standard sizes are available and transition sections can be provided for other duct sizes.
5. **Verify air flow requirements.** The table on the following page lists the minimum air flow (SCFM) required for each heater type.
6. Verify temperature rise using the following formula:

C° Temperature Rise	F° Temperature Rise
$C^{\circ} \text{ temp. rise} = \frac{kW \times 1667}{SCFM}$	$F^{\circ} \text{ temp. rise} = \frac{kW \times 3000}{SCFM}$

7. **Determine power supply voltage and phase.** Standard units are available in 208, 240, 480 or 600V, 3-phase. Optional 1-phase units also available.

## Standard Heater Features:

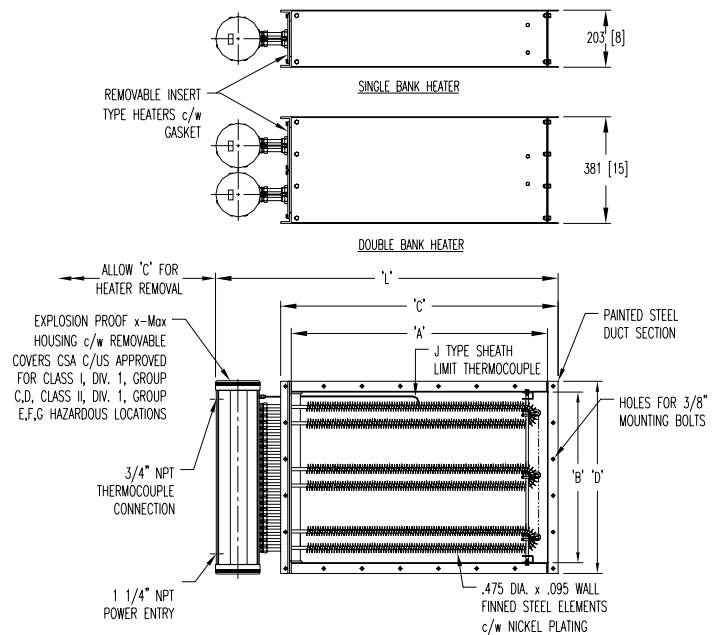
- T2D, T3A or T3B temperature code
- painted steel duct section
- differential pressure switch
- factory installed high limit sensing thermocouples
- extra heavy wall 0.095" (2 mm) finned tubular heating elements with nickel plated finish.

## Optional Features:

- transition sections
- stainless-steel duct section
- special temperature code
- outlet air thermostat
- outlet air thermocouple

## RXDF Physical Dimensions in inches (mm)

DUCT SIZE	A	B	C	D	L
24" x 12" (610 x 305)	24 (610)	12 (305)	27 (686)	15 (381)	36½ (927)
30" x 18" (762 x 457)	30 (762)	18 (457)	33 (838)	21 (533)	42½ (1080)
36" x 24" (914 x 610)	36 (914)	24 (610)	39 (991)	27 (686)	48½ (1232)



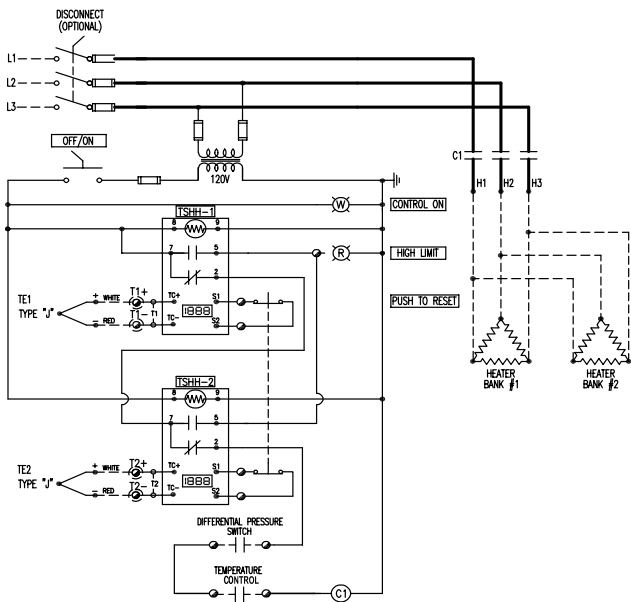
## Performance Data For RXDF Explosion-Proof Duct Heater

DUCT SIZE A x B	NUMBER OF HEATING BANKS	kW	AVAILABLE VOLTAGES		HIGH TEMP. RISE UNITS - T2D 215°C (419°F)				LOW TEMP. RISE UNITS - T3A 180°C (356°F) or T3B 165°C (329°F)				NET WEIGHT lbs (kg)				
			Class I, Div. 1 & 2, Groups C & D				Class I, Div. 1 & 2, Groups C & D Class II, Div. 1 & 2, Groups E & F Class II, Div. 1 & 2, Group G (T3B units only)										
			208 V 3 φ	240 V 3 φ	480 V 3 φ	600 V 3 φ	TEMP. CODE	CATALOG NO.	MAX. TEMP. RISE C° F°	MIN. AIR FLOW SCFM	TEMP. CODE	CATALOG NO.		MAX. TEMP. RISE C° F°	MIN. AIR FLOW SCFM		
24" x 12" (610 x 305 mm)	1	2.5	✓	✓	✓	✓	T2D	RXDF1-24x12-025T2D	7.7	13.9	540	T3B	RXDF1-24x12-025T3B	3.8	6.8	1107	90 (41)
		3.75	✓	✓	✓	✓	T2D	RXDF1-24x12-038T2D	11.6	20.8	540	T3B	RXDF1-24x12-038T3B	4.7	8.4	1334	
		5	✓	✓	✓	✓	T2D	RXDF1-24x12-050T2D	11.0	19.7	761	T3B	RXDF1-24x12-050T3B	5.3	9.6	1562	
	2	7.5	✓	✓	✓	✓	T2D	RXDF2-24x12-075T2D	10.0	18.0	1247	T3A	RXDF2-24x12-075T3A	7.2	13.0	1728	
		5	✓	✓	✓	✓	T2D	RXDF2-24x12-050T2D	15.4	27.8	540	T3B	RXDF2-24x12-050T3B	7.5	13.6	1107	
		7.5	✓	✓	✓	✓	T2D	RXDF2-24x12-075T2D	23.2	41.7	540	T3B	RXDF2-24x12-075T3B	9.4	16.9	1334	
30" x 18" (762 x 457 mm)	1	10	✓	✓	✓	✓	T2D	RXDF2-24x12-100T2D	21.9	39.4	761	T3B	RXDF2-24x12-100T3B	10.7	19.2	1562	160 (73)
		15	✓	✓	✓	✓	T2D	RXDF2-24x12-150T2D	20.1	36.1	1247	T3A	RXDF2-24x12-150T3A	14.5	26.0	1728	
		5	✓	✓	✓	✓	T2D	RXDF1-30x18-050T2D	8.2	14.8	1013	T3B	RXDF1-30x18-050T3B	4.0	7.1	2109	
		6.25	✓	✓	✓	✓	T2D	RXDF1-30x18-063T2D	10.3	18.5	1013	T3B	RXDF1-30x18-063T3B	4.5	8.0	2331	
		7.5	✓	✓	✓	✓	T2D	RXDF1-30x18-075T2D	12.3	22.2	1013	T3B	RXDF1-30x18-075T3B	4.9	8.8	2553	
		10	✓	✓	✓	✓	T2D	RXDF1-30x18-100T2D	10.8	19.5	1538	T3B	RXDF1-30x18-100T3B	5.6	10.0	2991	
	2	12.5	✓	✓	✓	✓	T2D	RXDF1-30x18-125T2D	10.5	18.9	1989	T3B	RXDF1-30x18-125T3B	6.1	10.9	3434	
		15	✓	✓	✓	✓	T2D	RXDF1-30x18-150T2D	10.2	18.4	2440	T3A	RXDF1-30x18-150T3A	7.5	13.5	3333	
		10	✓	✓	✓	✓	T2D	RXDF2-30x18-100T2D	16.5	29.6	1013	T3B	RXDF2-30x18-100T3B	7.9	14.2	2109	
		12.5	✓	✓	✓	✓	T2D	RXDF2-30x18-125T2D	20.6	37.0	1013	T3B	RXDF2-30x18-125T3B	8.9	16.1	2331	
		15	✓	✓	✓	✓	T2D	RXDF2-30x18-150T2D	24.7	44.5	1013	T3B	RXDF2-30x18-150T3B	9.8	17.6	2553	
		20	✓	✓	✓	✓	T2D	RXDF2-30x18-200T2D	21.7	39.0	1538	T3B	RXDF2-30x18-200T3B	11.1	20.1	2991	
36" x 24" (914 x 610 mm)	1	25	✓	✓	✓	✓	T2D	RXDF2-30x18-250T2D	21.0	37.7	1989	T3B	RXDF2-30x18-250T3B	12.1	21.8	3434	250 (114)
		30	✓	✓	✓	✓	T2D	RXDF2-30x18-300T2D	20.5	36.9	2440	T3A	RXDF2-30x18-300T3A	15.0	27.0	3333	
		7.5	✓	✓	✓	✓	T2D	RXDF1-36x24-075T2D	7.7	13.9	1620	T3B	RXDF1-36x24-075T3B	3.8	6.9	3256	
		10	✓	✓	✓	✓	T2D	RXDF1-36x24-100T2D	10.3	18.5	1620	T3B	RXDF1-36x24-100T3B	4.5	8.1	3690	
		12.5	✓	✓	✓	✓	T2D	RXDF1-36x24-125T2D	12.9	23.2	1620	T3B	RXDF1-36x24-125T3B	5.1	9.1	4125	
		15	✓	✓	✓	✓	T2D	RXDF1-36x24-150T2D	12.9	20.2	2230	T3B	RXDF1-36x24-150T3B	5.5	9.9	4559	
	2	20	✓	✓	✓	✓	T2D	RXDF1-36x24-200T2D	10.7	19.3	3115	T3B	RXDF1-36x24-200T3B	6.1	11.1	5428	
		25	—	✓	✓	✓	T2D	RXDF1-36x24-250T2D	10.4	18.8	4000	T3A	RXDF1-36x24-250T3A	7.7	13.8	5427	
		15	✓	✓	✓	✓	T2D	RXDF2-36x24-150T2D	15.4	27.8	1620	T3B	RXDF2-36x24-150T3B	7.7	13.8	3256	
		20	✓	✓	✓	✓	T2D	RXDF2-36x24-200T2D	20.6	37.0	1620	T3B	RXDF2-36x24-200T3B	9.0	16.3	3690	
		25	✓	✓	✓	✓	T2D	RXDF2-36x24-250T2D	25.7	46.3	1620	T3B	RXDF2-36x24-250T3B	10.1	18.2	4125	
		30	✓	✓	✓	✓	T2D	RXDF2-36x24-300T2D	22.4	40.4	2230	T3B	RXDF2-36x24-300T3B	11.0	19.7	4559	
2	40	✓	✓	✓	✓	T2D	RXDF2-36x24-400T2D	21.4	38.5	3115	T3B	RXDF2-36x24-400T3B	12.3	22.1	5426	325 (148)	
	50	—	✓	✓	✓	T2D	RXDF2-36x24-500T2D	20.8	37.5	4000	T3A	RXDF2-36x24-500T3A	15.4	27.6	5427		

To Order: Specify quantity, catalog no., voltage and phase, wattage, hazardous location designation, temperature code, control package and optional features.

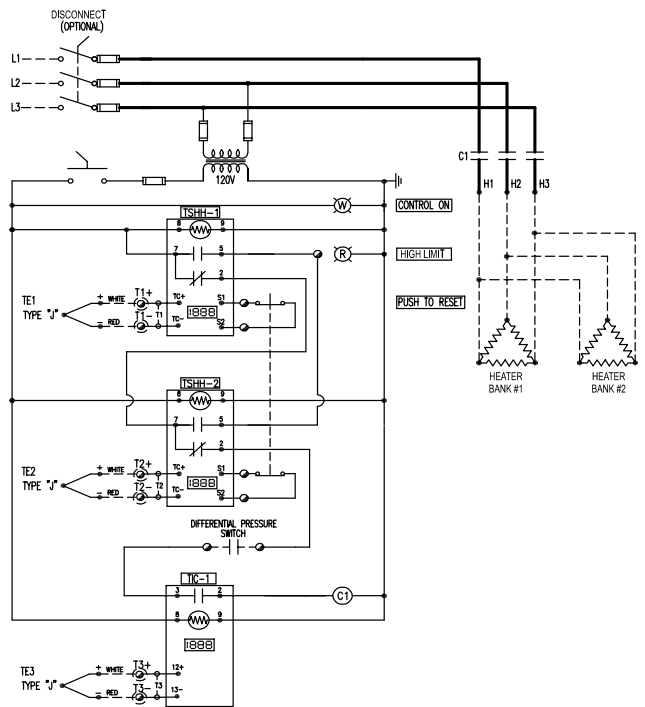
Table 2  
**RXDF**

### Package #1 - Basic Unit (ON/OFF Control)



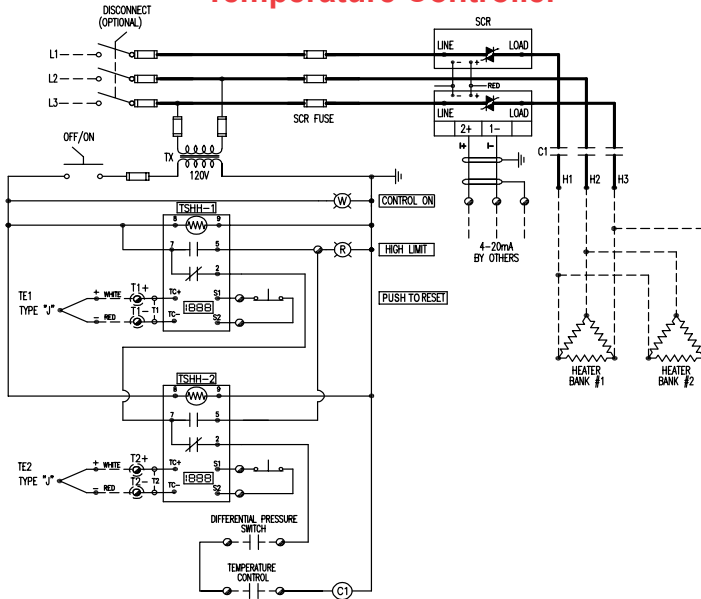
Notes:  
 ONE HIGH LIMIT CONTROL PROVIDED ON SINGLE BANK HEATERS.  
 TWO HIGH LIMIT CONTROLS PROVIDED ON DOUBLE BANK HEATERS.

### Package #2 - Built-in Temperature Controller



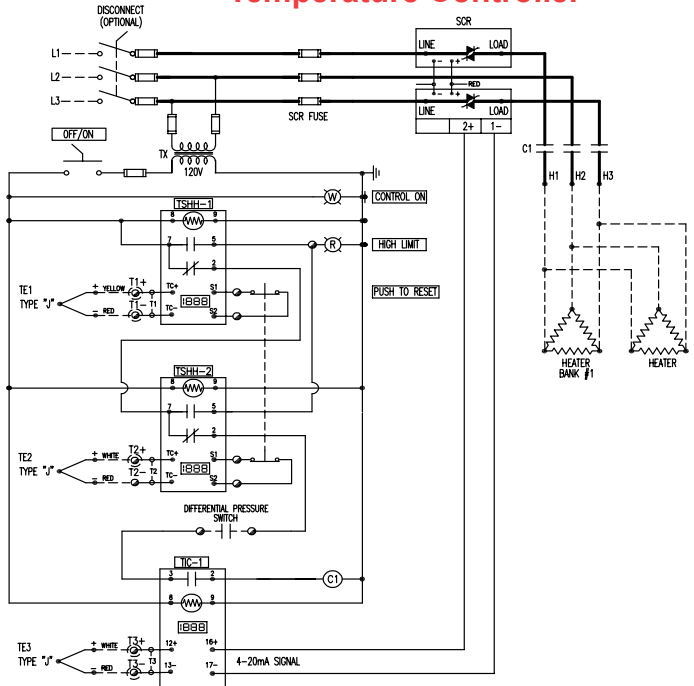
Notes:  
 ONE HIGH LIMIT CONTROL PROVIDED ON SINGLE BANK HEATERS.  
 TWO HIGH LIMIT CONTROLS PROVIDED ON DOUBLE BANK HEATERS.

### Package #3 - SCR with Remote Temperature Controller



Notes:  
 ONE HIGH LIMIT CONTROL PROVIDED ON SINGLE BANK HEATERS.  
 TWO HIGH LIMIT CONTROLS PROVIDED ON DOUBLE BANK HEATERS.

### Package #4 - SCR with Built-in Temperature Controller



Notes:  
 ONE HIGH LIMIT CONTROL PROVIDED ON SINGLE BANK HEATERS.  
 TWO HIGH LIMIT CONTROLS PROVIDED ON DOUBLE BANK HEATERS.

RXDF

## Control Panels for RXDF Duct Heaters Type RCPXD

Ruffneck™ type RXDF duct heaters are normally supplied with a type RCPXD control panel. These control panels are available in two basic types - type 4 moisture resistant or explosion proof - and with four different control packages as listed.

### Standard Features

All RCPXD control panels are supplied with magnetic contactors, HRC fusing, fused 120V control transformer, high limit controls, control circuit, ON/OFF switch, control ON light, high limit indicator light, high limit push-to-reset, terminals for connection of temperature controls and differential air pressure switch.

### Enclosure Types

RCPXD control panels are available with either type 4 moisture resistant enclosures or explosion-proof enclosures rated Class I, Div. 1 & 2, Groups C, D and Class II, Div. 1 & 2, Groups E, F, G.

**Table 3: Control Panel Specifications**

ENCLOSURE TYPE	NUMBER OF CIRCUITS	KW	AVAILABLE VOLTAGES				CATALOG NUMBER			
			208V 3 φ	240V 3 φ	480V 3 φ	600V 3 φ	PACKAGE #1	PACKAGE #2	PACKAGE #3	PACKAGE #4
TYPE 4 MOISTURE RESISTANT	1	2.5	✓	✓	✓	✓	RCPXD1-025R	RCPXD1-025TR	RCPXD1-025SR	RCPXD1-025STR
		3.75	✓	✓	✓	✓	RCPXD1-038R	RCPXD1-038TR	RCPXD1-038SR	RCPXD1-038STR
		5	✓	✓	✓	✓	RCPXD1-050R	RCPXD1-050TR	RCPXD1-050SR	RCPXD1-050STR
		6.25	✓	✓	✓	✓	RCPXD1-063R	RCPXD1-063TR	RCPXD1-063SR	RCPXD1-063STR
		7.5	✓	✓	✓	✓	RCPXD1-075R	RCPXD1-075TR	RCPXD1-075SR	RCPXD1-075STR
		10	✓	✓	✓	✓	RCPXD1-100R	RCPXD1-100TR	RCPXD1-100SR	RCPXD1-100STR
		12.5	✓	✓	✓	✓	RCPXD1-125R	RCPXD1-125TR	RCPXD1-125SR	RCPXD1-125STR
		15	✓	✓	✓	✓	RCPXD1-150R	RCPXD1-150TR	RCPXD1-150SR	RCPXD1-150STR
		20	✓	✓	✓	✓	RCPXD1-200R	RCPXD1-200TR	RCPXD1-200SR	RCPXD1-200STR
	25	—	✓	✓	✓	RCPXD1-250R	RCPXD1-250TR	RCPXD1-250SR	RCPXD1-250STR	
	2	5	✓	✓	✓	✓	RCPXD2-050R	RCPXD2-050TR	RCPXD2-050SR	RCPXD2-050STR
		7.5	✓	✓	✓	✓	RCPXD2-075R	RCPXD2-075TR	RCPXD2-075SR	RCPXD2-075STR
		10	✓	✓	✓	✓	RCPXD2-100R	RCPXD2-100TR	RCPXD2-100SR	RCPXD2-100STR
		12.5	✓	✓	✓	✓	RCPXD2-125R	RCPXD2-125TR	RCPXD2-125SR	RCPXD2-125STR
		15	✓	✓	✓	✓	RCPXD2-150R	RCPXD2-150TR	RCPXD2-150SR	RCPXD2-150STR
		20	✓	✓	✓	✓	RCPXD2-200R	RCPXD2-200TR	RCPXD2-200SR	RCPXD2-200STR
		25	—	✓	✓	✓	RCPXD2-250R	RCPXD2-250TR	RCPXD2-250SR	RCPXD2-250STR
		30	—	—	✓	✓	RCPXD2-300R	RCPXD2-300TR	RCPXD2-300SR	RCPXD2-300STR
40		—	—	✓	✓	RCPXD2-400R	RCPXD2-400TR	RCPXD2-400SR	RCPXD2-400STR	
50	—	—	✓	✓	RCPXD2-500R	RCPXD2-500TR	RCPXD2-500SR	RCPXD2-500STR		
EXPLOSION PROOF CLASS I, GROUP C & D CLASS II, GROUPE, F, & G	1	2.5	✓	✓	✓	✓	RCPXD1-025X	RCPXD1-025TX	RCPXD1-025SX	RCPXD1-025STX
		3.75	✓	✓	✓	✓	RCPXD1-038X	RCPXD1-038TX	RCPXD1-038SX	RCPXD1-038STX
		5	✓	✓	✓	✓	RCPXD1-050X	RCPXD1-050TX	RCPXD1-050SX	RCPXD1-050STX
		6.25	✓	✓	✓	✓	RCPXD1-063X	RCPXD1-063TX	RCPXD1-063SX	RCPXD1-063STX
		7.5	✓	✓	✓	✓	RCPXD1-075X	RCPXD1-075TX	RCPXD1-075SX	RCPXD1-075STX
		10	✓	✓	✓	✓	RCPXD1-100X	RCPXD1-100TX	RCPXD1-100SX	RCPXD1-100STX
		12.5	✓	✓	✓	✓	RCPXD1-125X	RCPXD1-125TX	RCPXD1-125SX	RCPXD1-125STX
		15	✓	✓	✓	✓	RCPXD1-150X	RCPXD1-150TX	RCPXD1-150SX	RCPXD1-150STX
		20	✓	✓	✓	✓	RCPXD1-200X	RCPXD1-200TX	RCPXD1-200SX	RCPXD1-200STX
	25	—	—	✓	✓	RCPXD1-250X	RCPXD1-250TX	RCPXD1-250SX	RCPXD1-250STX	
	2	5	✓	✓	✓	✓	RCPXD2-050X	RCPXD2-050TX	RCPXD2-050SX	RCPXD2-050STX
		7.5	✓	✓	✓	✓	RCPXD2-075X	RCPXD2-075TX	RCPXD2-075SX	RCPXD2-075STX
		10	✓	✓	✓	✓	RCPXD2-100X	RCPXD2-100TX	RCPXD2-100SX	RCPXD2-100STX
		12.5	✓	✓	✓	✓	RCPXD2-125X	RCPXD2-125TX	RCPXD2-125SX	RCPXD2-125STX
		15	✓	✓	✓	✓	RCPXD2-150X	RCPXD2-150TX	RCPXD2-150SX	RCPXD2-150STX
		20	✓	✓	✓	✓	RCPXD2-200X	RCPXD2-200TX	RCPXD2-200SX	RCPXD2-200STX
		25	—	✓	✓	✓	RCPXD2-250X	RCPXD2-250TX	RCPXD2-250SX	RCPXD2-250STX
		30	—	—	✓	✓	RCPXD2-300X	RCPXD2-300TX	RCPXD2-300SX	RCPXD2-300STX
40		—	—	✓	✓	RCPXD2-400X	RCPXD2-400TX	RCPXD2-400SX	RCPXD2-400STX	
50	—	—	✓	✓	RCPXD2-500X	RCPXD2-500TX	RCPXD2-500SX	RCPXD2-500STX		

**Note:** For optional disconnect switch, add suffix 'D' to end of catalog number.

## Control Packages

### Package #1 - Basic Unit (ON/OFF Control)

All standard features. Terminals are provided for connection to a remote ON/OFF temperature controller and connection of differential air pressure switch.

### Package #2 - Built-in Temperature Controller

Same features as Package #1 except with factory installed digital temperature controller for control of outlet air temperature.

### Package #3 - SCR with Remote Temperature Controller

All standard features and a factory installed full load zero fired SCR with terminals provided for remote 4-20 mA temperature control signal and connection of differential air pressure switch.

### Package #4 - SCR with Built-in Temperature Controller

Same features as Package #3 except with factory installed digital temperature controller for control of outlet air temperature.

**Note:** Some amperage limits apply to packages #3 and #4 in E.P. Enclosure. Consult factory for details.

**RXDF**

## Explosion-Proof Heaters Type RXDF Specification Sheet

### 1.0 Scope

Electric explosion-proof duct heaters shall be **Ruffneck™ type RXDF**, as manufactured by CCI Thermal Technologies Inc., complete with all standard equipment and optional features as specified below.

### 2.0 General

2.1 The heater is to be  $c_{CSA_{US}}$  certified with ratings as specified in 3.0.

2.2 The heater shall be provided with standard features and optional features as outlined in 4.0 and 6.0.

### 3.0 Specifications and Ratings

3.1 The duct heater shall be designed to heat air at \_\_\_\_\_ SCFM from \_\_\_\_\_ °C to \_\_\_\_\_ °C (\_\_\_\_\_ °F to \_\_\_\_\_ °F).

3.2 The heater shall be of the explosion-proof, duct type, catalog number \_\_\_\_\_, rated \_\_\_\_\_ V, \_\_\_\_\_ Phase, \_\_\_\_\_ Hz, \_\_\_\_\_ kW with the following hazardous locations rating.

Class \_\_\_\_\_, Divisions \_\_\_\_\_, Groups \_\_\_\_\_;

Class \_\_\_\_\_, Divisions \_\_\_\_\_, Groups \_\_\_\_\_.

3.3 The duct heater shall be marked with a \_\_\_\_\_ temperature code, or maximum surface temperature of \_\_\_\_\_.

3.4 The minimum rated airflow through the duct heater shall be \_\_\_\_\_ SCFM.

3.5 The maximum outlet temperature of the duct heater shall not exceed \_\_\_\_\_ °C (\_\_\_\_\_ °F).

3.6 The duct heater is to be mounted in a horizontal duct section  downstream /  upstream from the customer supplied blower.

3.7 The duct heater shall be suitable for operation in a -40°C (-40°F) min. to 40°C (104°F) max. ambient temperature.

### 4.0 Standard Features - Duct Heater

4.1 The duct heater shall be supplied with a \_\_\_\_\_" (H) × \_\_\_\_\_" (W) × \_\_\_\_\_" (L) carbon steel duct section with 1" wide mounting flange and painted ASA61 gray epoxy outside and high temperature aluminum inside.

4.2 The heating elements shall be 0.475" dia. (12 mm), extra heavy wall 0.095" (2 mm) finned tubular steel with nickel plated finish. Fins are to be fully brazed to the element sheath for maximum performance and efficiency.

4.3 The heating elements shall extend through CCI Thermal Technologies Inc. certified explosion-proof compression fittings into a patented **x-Max®** explosion-proof, extruded copper-free aluminum terminal housing(s) with 1¼" NPT power conduit entry and ¾" NPT conduit entry for high limit thermocouple connection.

4.4 The heating elements shall be mounted as \_\_\_\_\_ removable heating bank(s) and wired to terminal blocks for \_\_\_\_\_ × \_\_\_\_\_ kW, \_\_\_\_\_ V, \_\_\_\_\_ phase heating circuits to be  fully SCR controlled, or  ON/OFF control.

4.5 The duct heater shall be supplied with \_\_\_\_\_ 'J' type sheathed thermocouples welded or brazed to the element sheath for connection to  customer supplied /  factory installed certified high limit controllers. High limit set points will be factory preset.

4.6 An explosion-proof differential pressure switch is supplied as standard for field wiring to the remote control panel. Switch is intended to prove that the minimum airflow is maintained at all times. The differential pressure switch is to be:

factory mounted on the heater

supplied loose for field installation.

4.7 The duct heater shall be mounted in a horizontal duct section with the terminal box(es) at the side.

4.8 The approximate weight of the duct heater shall be \_\_\_\_\_ lbs

### 5.0 Standard Features - Control Package

5.1 Enclosure type (check one):

Type 4 - moisture-proof

Explosion-proof

5.2 Temperature control (check one):

Basic unit - customer supplied temperature control signal

Built-in temperature controller

SCR controller - customer supplied 4 - 20 mA control signal

SCR controller with built-in temperature controller

### 6.0 Optional Features and Equipment (check as desired)

Stainless-steel duct section

Transition sections to \_\_\_\_\_" (H) × \_\_\_\_\_" (W) duct or \_\_\_\_\_" round duct.

Special temperature code of \_\_\_\_\_.

RXDF