

# 1 Introduction

## 1.1 Revision History

Revision	Made By	Date	Changes
P4	Paul Everline	October 13, 2017	Corrected description from corrugated to helical copper tape
P3	Paul Everline	August 8, 2017	Changed to 32 Conductor, stranding, Part number, and Added Drain Wire
P2	Paul Everline	April 19, 2017	Changed conductor colors, changed overall OD
P1	Paul Everline	March 15, 2017	Initial release for specification 20170315-WRV

## 1.2 Scope

The purpose of **Specification 20170315-WRV**, this document, is to define the requirements of shielded multi-conductor, TC-ER rated power cable used in telecommunication indoor and outdoor applications. The part numbers covered in this document are listed in Table 1 below.

**Table 1: Part Numbers Covered by this Specification**

Part Number	Description
WR-V832SCU3	Rosenberger 8 AWG 32 conductor 168 strand bare copper with polyvinylchloride and nylon insulation, a helical bare copper tape shield with a 22 AWG drain wire, and with an overall PVC jacket 600V control tray cable, approved for use in SUN RES DIR BUR 90°C applications.

## 1.3 REFERENCE DOCUMENTS

- 1.3.1 **[R1]** UL Standard 83, LATEST VERSION  
“Thermoplastic-Insulated Wires and Cables”
- 1.3.2 **[R2]** UL Standard 1277, LATEST VERSION  
“Standard for Electrical Power and Control Tray Cables with Optional Optical-Fiber Members”
- 1.3.3 **[R3]** UL Standard 1581, LATEST VERSION  
“Reference Standard for Electrical Wires, Cables, and Flexible Cords”
- 1.3.4 **[R4]** ICEA-S-95-658/NEMA WC-70, LATEST VERSION  
“Power Cables Rated 2,000 V or Less for the Distribution of Electrical Energy”
- 1.3.5 **[R5]** ICEA-T-29-520, LATEST VERSION  
“Conducting Vertical Cable Tray Flame Tests with Theoretical Heat Input Rate of 210,000 B.T.U./Hour”
- 1.3.6 **[R6]** DIRECTIVE 2011/65/EU  
(RoHS) The restriction of the use of certain hazardous substances in electrical and electronic equipment
- 1.3.7 **[R7]** Regulation (EC) No 1907/2006  
Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)

## 2 Description

### 2.1 General Description

The shielded multi-conductor, TC-ER rated power cable is comprised of multiple conductors of THWN-2/VW-1 polyvinylchloride and nylon coated copper cable. The conductors are grouped within a single cable using a filler to make the overall cable round. There is a helical bare copper tape shield under the outer jacket. These cables are suitable for vertical tray locations as well as exposed and buried outdoor applications.

## 3 Specification

### 3.1 Environmental Requirements

The environmental requirements are listed below:

#### 3.1.1 Operating Temperature Range

Each conductor will function between -25 °C and 90 °C in dry and wet conditions as specified in reference document [R1] for THWN-2 wire.

#### 3.1.2 Water Resistance

Each conductor will meet the water resistance requirements as specified in reference document [R1] for THWN-2 wire.

#### 3.1.3 Sunlight Resistance

Each conductor will meet the sunlight resistance requirements as specified in reference document [R1] for THWN-2 wire.

#### 3.1.4 Vertical Flame Resistance

Each conductor will meet the VW-1 requirements as specified in reference document [R1] for THWN-2 wire.

#### 3.1.5 Cold Bend

The entire assembly will meet the cold bend requirements as specified in reference document [R1] for THWN-2 wire, but performed at -40 °C.

#### 3.1.6 Tray Cable Exposed Run

The entire assembly will meet the TC-ER requirements as specified in reference document [R2].

#### 3.1.7 Other conditions

Each conductor will meet all other environmental conditions as specified for THWN-2 wire in reference document [R1].

### 3.2 Electrical Requirements

#### 3.2.1 Maximum Voltage

Each conductor will function at 600 Volts or below as specified in reference document [R1] for THWN-2 wire.

#### 3.2.2 DC Resistance

The DC resistance for each conductor will be as specified in reference document [R1] for THWN-2 wire at the specified AWG for each part number.

### 3.3 Construction

#### 3.3.1 Conductors

The conductors for each part number will be as specified in Table 2.

Table 2: Conductor Construction	
Part Number	WR-V832SCU3
AWG Size	8
Strands	168
Conductor Material	Annealed Bare Copper
Conductor Count	32

#### 3.3.2 Insulation

The insulation for each part number will be as specified in Table 3. Tolerances for material thicknesses are as specified in [R1] for THWN-2 wire.

Table 3: Insulation Construction	
Part Number	WR-V832SCU3
Material	PVC and Nylon
Minimum PVC Wall Thickness (mils)	30
Minimum Nylon Wall Thickness (mils)	6
Colors	Black #1, Red #1 Black/Orange #2, Red/Orange #2 Black/Violet #3, Red/Violet #3 Black/Yellow #4, Red/Yellow #4 Black/Gray #5, Red/Gray #5 Black/Blue #6, Red/Blue #6 Black/Brown #7, Red/Brown #7 Black/Green #8, Red/Green #8 Black/White #9, Red/White #9 Black/White/Orange #10, Red/ White/Orange #10 Black/ White/Violet #11, Red/ White/Violet #11 Black/ White/Yellow #12, Red/ White/Yellow #12 Black/ White/Gray #13, Red/ White/Gray #13 Black/ White/Blue #14, Red/ White/Blue #14 Black/ White/Brown #15, Red/ White/Brown #15 Black/ White/Green #16, Red/ White/Green #16

**3.3.1 Assembly**

**3.3.1.1 Common Assembly Elements**

All part numbers shall be assembled as specified in Table 4. The filler is used to create a circular cross section.

<b>Table 4: Common Assembly</b>	
Lay length	Per Reference [R2]
Filler	Flame resistant, nonfibrous, and non-hygroscopic
Binder	Clear Mylar, 100% Coverage
Shield	3 mil Helical Bare Copper Tape
First Shield Coverage	100%
Ripcord	Yes

The drain wires shall be as specified in Table 5. The drain wire will have no insulation.

<b>Table 5: Drain Wires</b>	
Part Number	WR-V832SCU3
Drain Wire Material	Tinned Copper
Drain Wire AWG	22
Drain Wire Strands	7

**3.3.1.2 Outer Jacket**

The outer jacket shall be constructed as specified in Table 6. The filler is used to create

<b>Table 6: Outer Jacket</b>	
Part Number	WR-V832SCU3
Outer Jacket Material	PVC
Outer Jacket Material Thickness	Per Reference [R2]
Outer Jacket Wall Thickness (mils)	110
Outer Jacket Wall Thickness Tolerance	≥ 80% of Thickness Tolerance
Outer Jacket diameter (")	1.74 ± 0.140
Outer Jacket Color	Black

### **3.4 Markings**

The power cables are to be permanently and legibly marked with a print legend throughout its length at a maximum interval of 1 meter. The print legend shall include, but not be limited to:

ROSENBERGER  
Cable Part Number  
UL Listing number  
Number and size of conductors  
Maximum temperature rating (90°C DRY/WET)  
Voltage Rating (600 V)  
Year of Manufacture  
Type THWN-2/VW-1 (UL)  
Type TC-ER (UL)  
SUN RES DIR BUR OIL RES  
FT4  
ROHS II  
Footage markers

### **3.5 Other Requirements**

#### **3.5.1 RoHS**

The completed wire assembly will be RoHS II compliant as specified by [R6].

#### **3.5.2 REACH**

If the completed wire assembly meets the REACH requirements as specified in [R7], the additional text REACH will be added to the print legend specified in Section 3.4.

#### **3.5.3 Country of Origin**

If the completed wire assembly was manufactured in the United States, the additional text MADE IN USA will be added to the print legend specified in Section 3.4.

## **4 Compliance**

### **4.1 UL Listing**

The wire shall be UL listed to demonstrate the construction meets the UL requirements for TC-ER cable. The UL listing number shall be part of the markings on the product as described in 3.4.

### **4.2 Multiple Listing Correlation**

Rosenberger Site Solution, LLC will also require a multiple listing correlation sheet that will allow the Rosenberger name to appear on the cable along with the UL listing number. Terms and agreement on how this is to be achieved shall be agreed upon in a separate document prior to full approval of this product.