

# TECHNICAL NEWS

from

 THE OKONITE COMPANY

Engineering  
Information  
for the  
Professional  
Engineer

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## CABLE IMPEDANCE CALCULATIONS

Positive- and negative-sequence impedance of a cable is defined as the impedance, or the AC resistance and series inductive reactance, to the normal flow of AC current in a cable. This impedance takes into account skin effect, proximity effect, and the current flowing in adjacent conductors, shields/sheaths, and metallic conduit. It is commonly designated as  $Z1 = Z2 = R_{ac} + jx$ , where  $Z1$  is the Positive-Sequence impedance and  $Z2$  is the Negative-Sequence impedance.

Zero-Sequence impedance is defined as the impedance to the flow of AC currents which are equal and in phase and return through ground and/or a ground conductor. This impedance is primarily used when calculating fault, or short circuit, current in a system. For cable(s), this impedance takes into account the resistance of any ground wire, or path to ground, and earth resistance, along with the parameters listed above for Positive- and Negative-Sequence impedance. It is commonly designated as  $Z_0 = R_0 + jX_0$ .

In order to expedite these impedance calculations, Applications Engineering requires data regarding cable construction and installation.

If you have cable impedance calculations requests, please submit your request on the form attached. Submit this completed form to your Local District Office. If you do not know how to contact the District Office assigned to your account, please consult our web-site at [www.okonite.com](http://www.okonite.com).

Visit us on the World Wide Web  
[www.okonite.com](http://www.okonite.com)

Our new Engineering and Technical Center is now on line

# APPLICATIONS ENGINEERING DEPARTMENT IMPEDANCE CALCULATION CHECKLIST

## GENERAL INFORMATION

Customer \_\_\_\_\_

Address \_\_\_\_\_ Phone # \_\_\_\_\_

E-Mail Address \_\_\_\_\_

Project Identification \_\_\_\_\_

## I. CABLE DESCRIPTION

A. Catalog No. \_\_\_\_\_  
(If applicable, go to Part II or III)

B. Complete Cable Description including any special shield design.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## II. CONDUCTOR SPACING (Check One)

A. 1-1/C (Single Phase URD) \_\_\_\_\_

B. 3-1/C's (Cradled) \_\_\_\_\_

C. 3/C or Triplexed \_\_\_\_\_

D. 1/C per conduit or Duct \_\_\_\_\_  
(Conduit or Duct horizontal and/or vertical spacing required. Attach sketch if available.)

## III. TYPE OF INSTALLATION (Check One)

1. PVC duct \_\_\_\_\_ W/Gnd (size) \_\_\_\_\_

2. Alum. Conduit \_\_\_\_\_ W/Gnd (size) \_\_\_\_\_

3. GS Conduit \_\_\_\_\_ W/Gnd (size) \_\_\_\_\_

4. Direct Burial \_\_\_\_\_ W/Gnd (size) \_\_\_\_\_

5. Cable Tray/Aerial \_\_\_\_\_