

American Society of Irrigation Consultants



ASIC Guideline 101-2003 (November 2003) For Communication Cable

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For Communication Cable**



1.0 Scope

This guideline covers cable suitable for direct burial designed to carry signals for communication with pump system control panels, weather stations, sensors, and other irrigation data links based upon the requirements of the National Electrical Code (NEC) and those of the equipment manufacturers. The information herein is not to be perceived as an official interpretation of the NEC or local codes. This guideline does not apply to manufacturer-specific controller communication.

1.1 Purpose

A guide for irrigation industry personnel who are involved in design, manufacturing, distribution, installation, and maintenance of irrigation and pump systems.

1.2 Implementation

Specifications for electrical cable designed for the above-mentioned communication links shall be written and administered by the irrigation professional, herein referred to as "the designer".

2.0 References

The following documents and references were used as a basis for this guideline. This material is subject to revisions.

NFPA 70, National Electrical Code, National Fire Protection Systems, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, <http://www.nfpa.org>.

Copper Brass Bronze Product Handbook, Copper Development Association, Inc., Box 1840, Greenwich, CT 06836-1840, <http://www.copper.org>.

American Society of Testing and Materials (ASTM), 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA, 19428-2959, <http://www.astm.org>.

SyncroFlo, Inc. 6700 Best Friend Road, Norcross, GA 30071, <http://www.syncroflo.com>.

Watertronics, Inc., 525 Industrial Drive, Hartland, WI 53029, <http://www.watertronics.com>.

Carroll Childers Company, 4922 Alameda Genoa, Houston, TX 77048, <http://www.ccctexas.com>.

Flowtronex PSI, 10661 Newkirk Street, Dallas, TX 75220, <http://www.flowtronex.net>.

Data Industrial Corporation, P. O. Box 740, Mattapoisett, MA, 02739 <http://www.dataindustrial.com>.

3.0 Safety

The requirements of the National Electrical Code shall prevail to ensure safety. Local electrical codes may apply additionally as determined by the Consultant. Local codes shall only enhance requirements of the NEC.

4.0 Definitions

American Society of Testing and Materials (ASTM) – A not-for-profit organization that provides a global forum for the development and publication of voluntary consensus standards for materials, products, systems, and services.

Approved Equal – The use of a manufacturer's name and model or catalog number is for the sole purpose of establishing the standard of quality and general configuration desired. The Consultant may submit other manufacturer's equipment for approval. Only upon submittal and subsequent approval of the material list shall these items be permitted.

AWG – American Wire Gauge; standard system in North America for designating wire conductor size.

Bare Copper Conductor – Non-insulated conductor.

Cable – Either a single conductor with or without insulation or a combination of conductors insulated from each other within one jacket.

Conductor – A material, usually copper or aluminum, which carries electricity.

Drain Wire – An uninsulated wire in a cable used in conjunction with shield tape to facilitate connection to earth ground.

Insulation – A non-conductive material which offers high electrical resistance. It is suitable for covering electrical wire and devices to prevent damage from hot wires/devices coming in contact with each other.

Outer Jacket – An overall covering of cable, interchangeably termed sheath.

National Electrical Code (NEC) – A consensus standard developed by the National Fire Protection Association.

Shall – As used in this guideline, designates a mandatory requirement.

Shield – A conducting envelope constructed such that every point on the surface of the insulation is at ground potential under normal operating conditions.

Should- As used in this guideline, designates a suggestion or recommendation.

Soft Drawn Copper – Physical property of a conductor which makes it more pliable.

Stranded Conductor – A conductor composed of a group of small wires or groups of wires twisted together.

Tinned Conductor – A copper conductor coated with tin or other metal to help slow corrosion and to facilitate soldering.

Underwriters Laboratories (UL) – Testing authority for electrical product safety. Products which meet standards are UL listed; the listing relates to safety issues and to performance claims by the manufacturer.



5.0 Designer

The application of the communication cable shall be as specified by a competent irrigation professional. The application shall comply with the requirements of national and local electrical codes.

6.0 Installer

An individual contractor, licensed electrician, or organization deemed qualified by the designer to install and test the communication cable while meeting all applicable local and national electrical codes.

7.0 Construction Specifications

7.1 Conductors

Soft drawn bare or tinned copper, solid or stranded
Size - Minimum 20 AWG

7.2 Number of conductors

Minimum 4 conductors/2 pair: each shall be twisted together

7.3 Conductor Insulation

Polyvinyl chloride, polypropylene or polyethylene—Minimum nominal thickness 0.013"

7.4 Cable Assembly

Insulated conductors are twisted into pairs of varying lays and different colors, and then cabled together

7.5 Shield

0.002" aluminum polyester tape, helically or longitudinally wrapped, over each or all pairs, providing 100% shielding

7.6 Drain Wire

Minimum 20 AWG tinned copper (solid or stranded) bare wire for each pair or all the pairs, laid under the shield in contact with aluminum side of tape for each pair or all the pairs

7.7 Outer Jacket Insulation

Polyvinyl chloride or polyethylene – Minimum nominal thickness 0.040"

7.8 Listing

UL Listed for direct burial, or REA recognized PE-39 or PE-54.

8.0 Installation

8.1 Communication cable should not be placed in the same conduit as power cable.

8.2 Communication cable may be placed in the same trench as 120 or 240-volt controller power cable with a minimum of 12" of separation.

8.3 If surge suppressors are specified by the designer, they should be installed at both ends of communication cable in accordance with the device manufacturer's recommendations.

8.4 Communication cable should be installed as one continuous station between linked devices and splices should be avoided. If splices are necessary, they must be approved by the designer and they should conform to the following:

Connection of Conductors – butt connectors or insulation displacement connectors

Insulation – 3M model 82A Series resin kit, or 3M model SliC buried service wire kit, or approved equal

8.5 Drain wire shall be grounded at both ends of communication cable unless linked devices are on different power sources, in which case only one end of the drain wire shall be grounded.

8.6 Minimum direct burial depth shall be as specified by the designer, but in no case less than 12 inches. If cable signal strength is more than 30 volts, burial depth shall be minimum 24 inches. Current prevailing local codes take precedence.

8.7 Installation shall be by laying with a vibratory plow or open trenching. Pulling of communication cable shall not be allowed.

8.8 All above-ground communication cables shall be installed in conduit according to the NEC and local code.

9.0 Conforming Cables

9.1 The following are examples of conforming cables (others may qualify):

Paige Electric Specifications P7171D, P7195D, and P7315D

Regency Wire & Cable Specifications 1804S and DBS203P

9.2 The designer should check latest revision to manufacturer's specification to ensure compliance with this guideline.

Disclaimer: The American Society of Irrigation Consultants (ASIC) has made every effort to ensure that the information and recommendations contained herein are correct. However, neither ASIC nor any of its members warrants nor accepts any liability for the use of this information. National and local electrical codes should always be followed. Wiring irrigation system components requires qualified engineering judgment on a case-by-case basis. Competent engineering assistance should be sought from Professional Members of ASIC.