



## Designation: **F2321–05 (Reapproved 2013) F2321 – 14**

# Standard Specification for Flexible and Rigid Insulated Temporary By-Pass Jumpers<sup>1</sup>

This standard is issued under the fixed designation F2321; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

## 1. Scope

1.1 These specifications cover the manufacture and testing of flexible insulated temporary ~~bypass~~By-Pass jumpers (~~bypass~~(By-Pass jumpers) used on energized power lines and equipment.

1.2 It is common practice for the user of this protective equipment to prepare complete instructions and safety regulations to govern in detail the correct and safe use of such equipment. Also see 4.2.

1.3 The use and maintenance of this equipment are beyond the scope of these specifications.

1.4 These specifications for a system of ~~bypass~~By-Pass jumpers is covered in four parts as follows:

Title	Sections
<del>Clamps for Bypass Jumpers</del>	<del>5 – 17</del>
Clamps for By-Pass Jumpers	5 – 17
<del>Ferrules for Bypass Jumpers</del>	<del>18 – 31</del>
Ferrules for By-Pass Jumpers	18 – 31
<del>Cable for Bypass Jumpers</del>	<del>32 – 40</del>
Cable for By-Pass Jumpers	32 – 40
<del>Bypass Jumpers (complete assembly — with clamps, ferrules, and cable)</del>	<del>41 – 55</del>
By-Pass Jumpers (complete assembly — with clamps, ferrules, and cable)	41 – 55

1.5 Each of the four parts is an entity of itself, but is listed as a part of the system for completeness and clarification.

1.6 The values stated in SI units are to be regarded as the standard. See ASTM-IEEE/ASTM SI 10.

1.7 The following precautionary caveat pertains only to the test method portions, Sections 13, 26, 48, and 55 of these specifications. *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory requirements prior to use.*

## 2. Referenced Documents

2.1 *ASTM Standards:*<sup>2</sup>

[B33 Specification for Tin-Coated Soft or Annealed Copper Wire for Electrical Purposes](#)

[B172 Specification for Rope-Lay-Stranded Copper Conductors Having Bunch-Stranded Members, for Electrical Conductors](#)

[B173 Specification for Rope-Lay-Stranded Copper Conductors Having Concentric-Stranded Members, for Electrical Conductors](#)

[D2768 Specification for General-Purpose Ethylene-Propylene Rubber Jacket for Wire and Cable \(Withdrawn 2007\)](#)<sup>3</sup>

[D2770 Specification for Ozone-Resisting Ethylene-Propylene Rubber Integral Insulation and Jacket for Wire and Cable \(Withdrawn 2007\)](#)<sup>3</sup>

[D2802 Specification for Ozone-Resistant Ethylene-Alkene Polymer Insulation for Wire and Cable](#)

[D2865 Practice for Calibration of Standards and Equipment for Electrical Insulating Materials Testing](#)

[E8 Test Methods for Tension Testing of Metallic Materials](#)

[F819 Terminology Relating to Electrical Protective Equipment for Workers](#)

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee F18 on Electrical Protective Equipment for Workers and is the direct responsibility of Subcommittee F18.45 on Mechanical Apparatus.

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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> The last approved version of this historical standard is referenced on www.astm.org.

IEEE/ASTM SI 10 American National Standard for Metric Practice

2.2 ANSI Standards:<sup>4</sup>

ANSI C39.5 Safety Requirements for Electrical and Electronic Measuring and Controlling Instruments

ANSI C84.1 Voltage Ratings for Electric Power Systems and Equipment (60 Hz)

ANSI C119.4 American National Standard for Electrical Connectors

2.3 NEMA Standard:<sup>5</sup>

WC 8 Ethylene-Propylene-Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy (formerly ICEA S-68-516)

### 3. Terminology

#### 3.1 Definitions:

3.1.1 *flexible and rigid insulated temporary bypass* **By-Pass jumpers**—devices designed and used to keep electric supply circuits effectively continuous (electrically bridged) for short periods of time at work locations when conductors or equipment may otherwise be opened or made electrically discontinuous during work operations.

<sup>4</sup> Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

<sup>5</sup> Available from National Electrical Manufacturers Association (NEMA), 1300 N. 17th St., Suite 1847, Rosslyn, VA 22209.

#### 3.1.1.1 Discussion—

The devices are normally installed, used, and removed as part of a protective insulating system composed of insulating covers and/or observances of required minimum safe approach distances for workers.

3.1.2 *voltage, normal design*—a nominal value consistent with the latest revision of ANSI C84.1, assigned to the circuit or system for the purpose of conveniently designating its voltage class.

3.1.3 *voltage, maximum use*—the ac voltage (rms) classification of the protective equipment that designates the maximum nominal design voltage of the energized system that may be safely worked. The nominal design voltage is equal to phase-to-phase voltage on multiphase circuits.

#### 3.1.3.1 Discussion—

If there is no multiphase exposure in a system area, and the voltage exposure is limited to phase (polarity on dc systems) to ground potential, the phase (polarity on dc systems) to ground potential shall be considered to be the nominal design voltage.

#### 3.1.3.2 Discussion—

If electrical equipment and devices are insulated or isolated, or both, such that the multiphase exposure on a grounded wye circuit is removed, then the nominal design voltage may be considered as the phase-to-ground voltage on that circuit.

NOTE 1—The work practices and methods associated with removing multiphase exposures at any given work site are not addressed in this specification.

3.2 For definitions of other terms, refer to Terminology **F819**.

### 4. Significance and Use

4.1 These specifications cover the minimum electrical and physical properties designated by the manufacturer and the detailed procedures by which such properties are to be determined. The purchaser may at his option perform or have performed any of these tests in order to verify the manufacturer's designation. Claims for failure to meet the specification are subject to verification by the manufacturer.

4.2 **By-Pass** **By-Pass** jumpers are devices designed and used to keep electrical circuits effectively continuous (electrically bridged) for short periods of time at work locations when conductors or equipment may otherwise be opened or made discontinuous during work operations. **By-Pass** **By-Pass** jumpers are insulated to temporarily protect personnel from brush or accidental contact only; therefore, when authorizing their use, a margin of safety should be provided between the maximum voltage used on, and the proof-test voltage at which they are tested. The relationship between proof-test voltage and the maximum voltage at which **by-pass** **By-Pass** jumpers are used is shown in **Table 1**. **Warning**—Portions of these devices (clamps and ferrules) are not insulated and offer no protection from accidental contact.

#### CLAMPS FOR **BY-PASS** **BY-PASS** JUMPERS

### 5. Scope

5.1 This specification covers clamps used in the assembly of **by-pass** **By-Pass** jumpers.