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Telecommunications
Engineers***

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Interface Practices Subcommittee**

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Passive Network Device (NID) Enclosure Specification

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1. Scope

This specification applies to recommended mechanical, electrical and environmental performance of Network Interface Device enclosures for use in broadband deployment.

The intended location for this device is on the outside of the customer premise.

This specification focuses on non-metallic enclosures.

2. Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of the standard. At the time of Subcommittee approval, the editions indicated were valid. All standards are subject to revision; and while parties to any agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents may not be compatible with the referenced version.

- ANSI/NFPA 70, National Electrical Code,
- ASTM B117-90, Standard Method of Salt Spray (Fog) Testing
- ASTM G21, Recommended Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
- ASTM G155, Standard Practice for Operating Light-Exposure Apparatus (Xenon-Arc Type) With and Without Water for Exposure of nonmetallic Materials, Method “B”
- Underwriters Laboratories UL 94, Tests for Flammability of Plastic Materials
- Underwriters Laboratories UL 746C, Polymeric Materials – Use in Electrical Equipment Evaluations
- Underwriters Laboratories UL 1863, Standard for Communication Circuit Accessories.

3. Informative References

The following documents may provide valuable information to the reader but are not required when complying with this standard.

- No references are applicable

4. Compliance Notation

<i>shall</i>	This word or the adjective “ <i>required</i> ” means that the item is an absolute requirement of this specification.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this specification.
<i>forbidden</i>	This word means the value specified shall never be used.
<i>should</i>	This word or the adjective “ <i>recommended</i> ” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.
<i>should not</i>	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
<i>may</i>	This word or the adjective “ <i>optional</i> ” means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.
<i>deprecated</i>	Use is permissible for legacy purposes only. Deprecated features may be removed from future versions of the standard. Implementations should avoid use of deprecated features.

5. Purpose

The purpose of this specification is to recommend a standard set of design requirements for Network Interface Device enclosures which are used to mount and enclose drop components for outdoor broadband applications.

The specification in no way should limit or restrict any manufacturer’s innovation and improvement. Innovations and improvements are encouraged and this specification may be adjusted when beneficial.

6. General Characteristics

All NIDs that meet the standards proposed by this document shall have the following characteristics and pass the tests and their requirements list herein. See Figures 1-5 for sample drawings of such NIDs.

1. Provide a secure demarcation connection point between the network provider wiring and the subscriber wiring.
2. May provide isolated access between the subscriber and provider within the NID itself.
3. The NID shall have an attached lid or cover.
4. Serve as a convenient test point for verification of coaxial cable, twisted pair or optical cable integrity.
5. Provide a weatherproof housing to increase the long term performance of broadband passive drop related components.
6. House and install coaxial, twisted pair or optical broadband related devices.
7. Provide weatherproof ports for coaxial cable, twisted pair and optical cable.
8. A 3/8” (9.5 mm) long, #6 self-tapping screw inserted into any mounting hole and tightened with a torque of 20 lb-in (2.26 N-m) shall not cause cracking of the mounting hole or mounting surface nor shall the threads strip.
9. The NID enclosure shall be able to contain an electrical bonding point or block.

10. The input cable port shall be sufficient in size to allow for cable with an outside diameter of ½-inches (12.7 mm). All other ports shall accept cable diameters up to 0.405" (10.29 mm).
11. The NID enclosure shall allow for the minimum bending radius of the type of cable used as specified by the manufacturer.
12. Mounting holes or slots shall be of such size and location as to allow orthogonal mounting of the device on a hole centerline pattern/grid of 0.500" by 0.500" +/-0.010" (12.7mm x 12.7mm +/- 0.25mm). No through holes are permitted so as to prevent water entry. Mounting holes must accommodate a #6 self-tapping screw, extended a maximum of ½-inches (12.7 mm) into the mounting surface.
13. The NID enclosure shall meet any applicable requirements of ANSI/NFPA 70 National Electrical Code (NEC). In addition, when the NID contains telephony demarcation, it shall meet, as a minimum, the generic requirements for Outdoor Telephone Network Interface Devices listed in this document where applicable.
14. All passive drop components used inside the NID enclosure must meet their applicable SCTE specification.

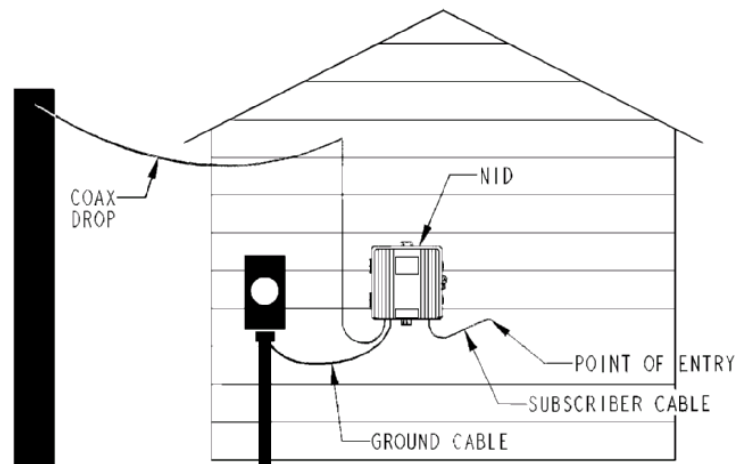


Figure 1 – A typical installation of a NID enclosure in relation to the point-of-entry

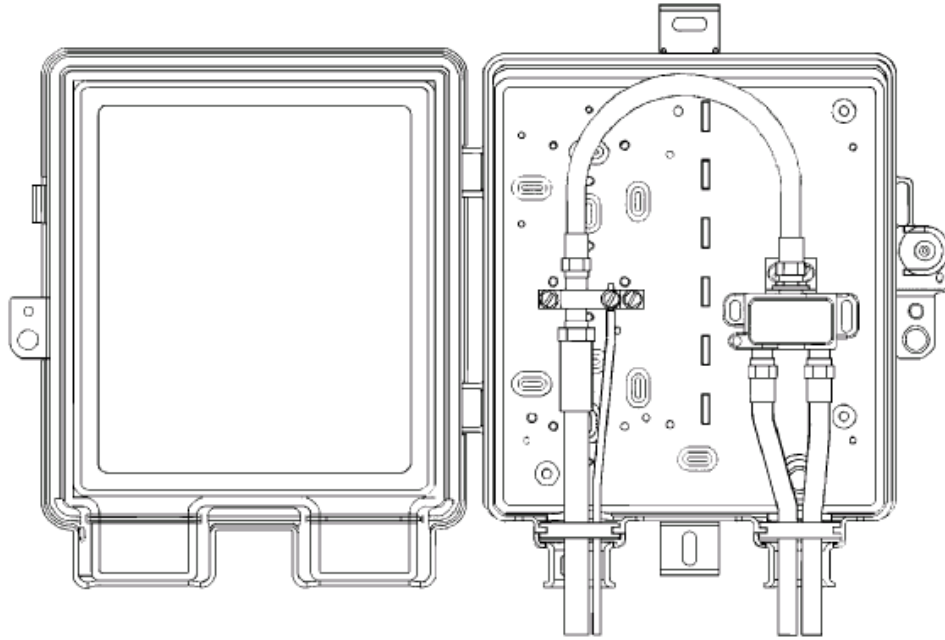


Figure 2 - A Broadband Telecommunications Passive NID enclosure equipped with a bonding block, jumper cable and a 2-way splitter

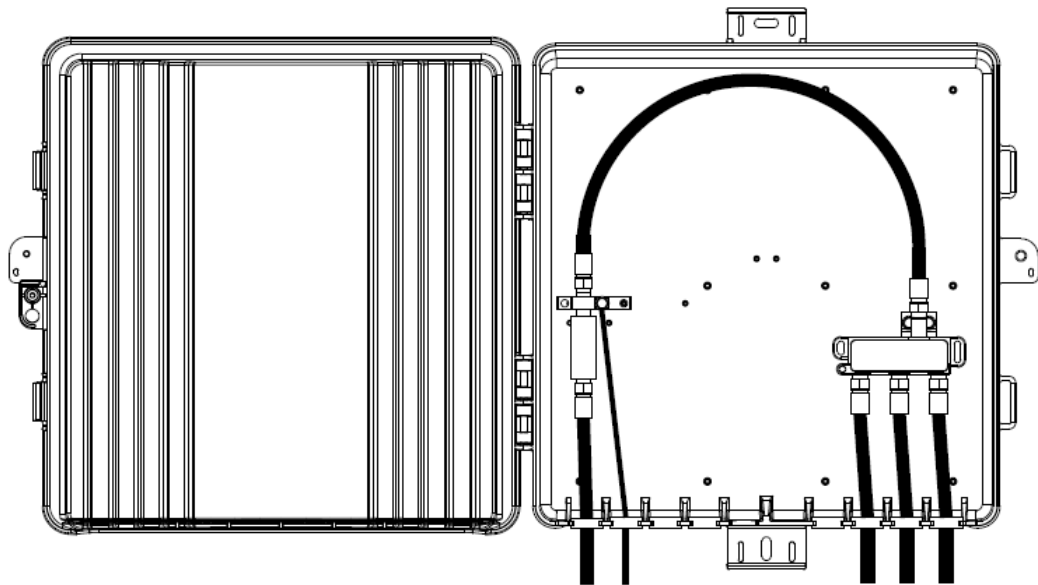


Figure 3 – A Broadband Telecommunications Passive NID enclosure equipped with telephony components in addition to Broadband Telecommunications components

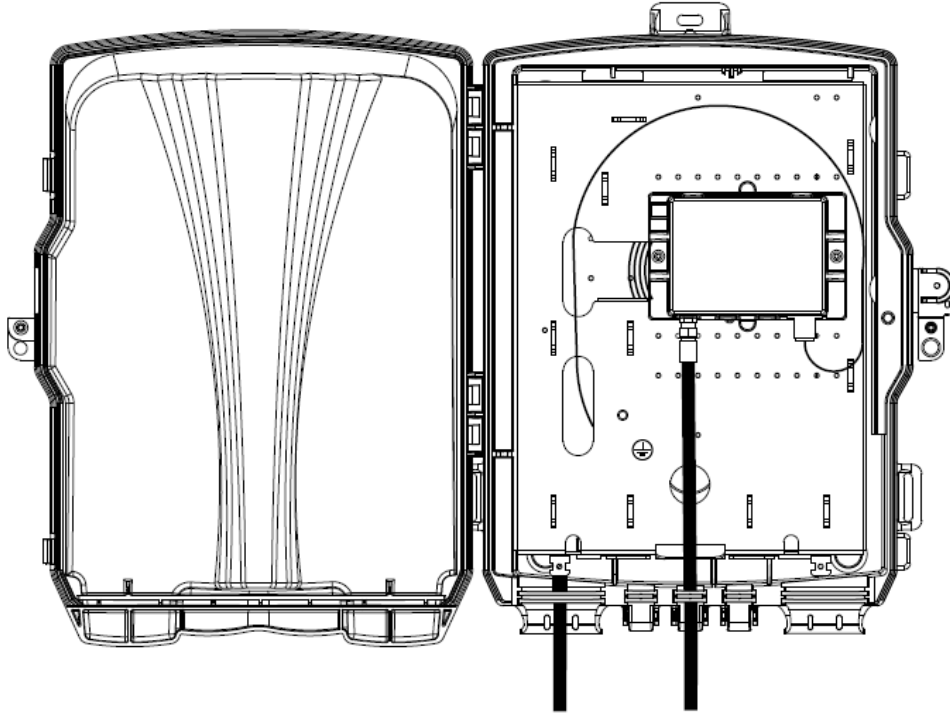


Figure 4 - A twisted pair telephone NID enclosure equipped with single coax line

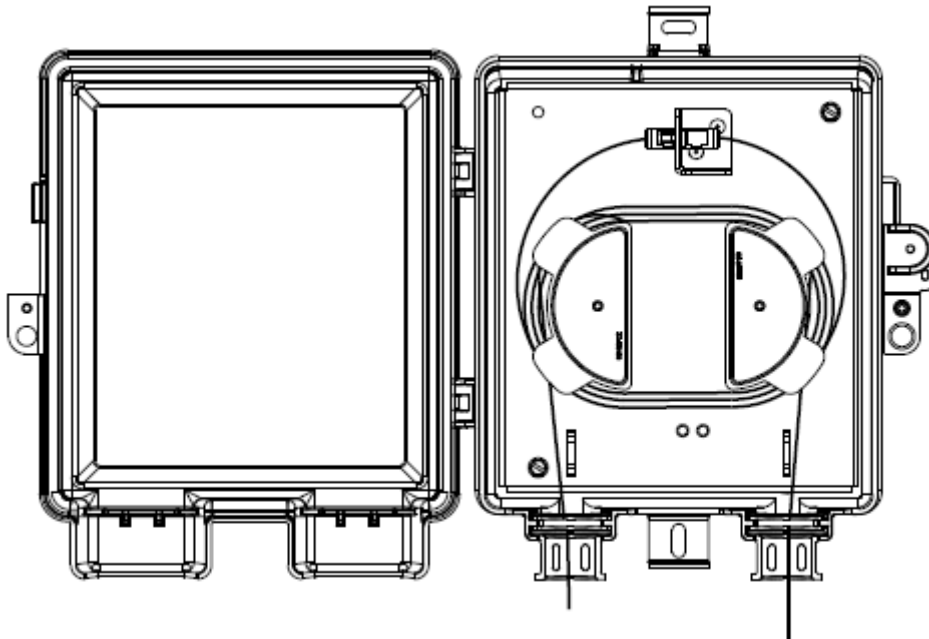


Figure 5 – A single-fiber transition NID enclosure equipped with a single fiber line

7. Electrical Testing

7.1. Dielectric withstand

7.1.1. Requirement 1

The dielectric withstand of the NID to its mounting surface shall be no less than 2500 volts root mean square (Vrms) between the connections inside the NID enclosure and the metallic mounting surface to which the NID enclosure is mounted.

7.1.2. Requirement 2

The NID enclosure shall not degrade the performance of any installed components, and said components when installed inside the NID enclosure must still meet all of their appropriate SCTE specifications after electrical testing is complete.

7.1.3. Test Apparatus

The Outdoor NID is to be installed on a metallic plate with the appropriate metallic screws. The plate itself is to be electrically isolated from any metallic component on the NID, specifically the terminals. All terminals are bonded together.

7.1.4. Test Procedure

Over a 30 second time interval, the voltage will be gradually increased from 0 to 2500 Vrms, and will be applied for 1 minute between the NID terminals and the plate.

8. Environmental Testing

8.1. High Temperature Storage

8.1.1. Requirement

The NID enclosure shall resist and show minimal signs of fading, peeling, warping, cracking, deformation and degradation of the material so as not to affect its overall function.

8.1.2. Test Apparatus

The unmounted NID enclosure shall be placed inside a temperature controlled environment.

8.1.3. Test Procedure

The NID enclosure shall withstand the high temperature storage conditions specified in UL 746C, Section 19. The 158°F (70°C) high temperature storage duration shall be 14 days.

8.2. Temperature Cycling

8.2.1. Requirement

The NID enclosure shall resist and show minimal signs of fading, peeling, warping, cracking, deformation and degradation of the material so as not to affect its overall function.

8.2.2. Test Apparatus

The NID enclosure shall be placed inside a temperature controlled environment and mounted in a vertical position to represent a typical field installation

8.2.3. Test Procedure

The NID enclosure shall withstand the following temperature cycling conditions: The outdoor NID shall be subjected to 90, 8-hour cycles from -40°F (-40°C) to 140°F (60°C). Each 8-hour cycle will consist of 1-hr ramp rates to temperature extremes and 3-hr dwells at temperature. Measurement of the series resistance between LEC entrance wire connection terminal to the subscriber side connection terminal is not required.

8.3. Temperature Cycling with Humidity

8.3.1. Requirement

The NID enclosure shall resist and show minimal signs of fading, peeling, warping, cracking, deformation and degradation of the material so as not to affect its overall function.

8.3.2. Test Apparatus

The NID enclosure shall be placed inside a temperature controlled environment and mounted in a vertical position to represent a typical field installation.

8.3.3. Test Procedure

The NID enclosure shall withstand the following temperature cycling conditions: The outdoor NID shall be subjected 60, 12-hour cycles from 40°F (4.4°C) to 140°F (60°C) at a relative humidity of 95%. Each 12-hour cycle will consist of 1-hr ramp rates to temperature extremes and 3-hr dwells at temperature.

8.4. Rain

8.4.1. Requirement

The NID shall prevent the entry of rain water when installed as intended to provide effective protection / cover for equipment

8.4.2. Test Apparatus

The unpackaged NID enclosure is mounted in a vertical position to represent a typical field installation.

8.4.3. Test Procedure

Follow the procedure per the UL 1863 - Rain Test with the exception that the test shall be conducted for 24 hours, and the water pressure shall be maintained at 10 psi (34 kPa) at each spray head.

8.5. Salt Fog

8.5.1. Requirement

The NID enclosure and its supplied components shall show minimal signs of corrosion, blistering, fading, and peeling when installed as intended and subjected to the conditions of the ASTM B117-90, *Standards Method of Salt Spray (Fog) Testing*.

8.5.2. Test Apparatus

The unpackaged NID enclosure is placed inside a sealed environment in which a salt mist is injected into the environment.

8.5.3. Test Procedure

The salt-mist shall be introduced into the sealed environment for 30 days with a 5% salt solution per ASTM B117-90.

8.6. Ultra-violet Light Resistance

8.6.1. Requirement

The NID enclosure shall show no signs of blistering, peeling, bulging, cracking, softening, crazing, and warping when installed as per the recommended installation instructions and subjected to solar radiation as simulated by this procedure.

8.6.2. Test Procedure

The unpackaged, closed NID or the primary door exposed to the sun shall be tested in accordance with ASTM G155 – 05a *Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials*. Utilize the Cycle 1 exposure condition from Table X3.1 for a total duration of 1000 hours.

8.7. Flammability

8.7.1. Requirement

The external enclosure portion of the NID shall be made of materials that have a flame rating of UL 94-5V. Internal supplied components of the NID enclosure shall be made of materials that have a flame rating of at least UL 94V-0 or 94V-2.

8.7.2. Test Apparatus

Refer to UL 94, *Tests for Flammability of Plastic Materials*.

8.7.3. Test Procedure

Refer to UL 94, *Tests for Flammability of Plastic Materials*.

8.8. Chemical Resistance

8.8.1. Requirement

The NID enclosure shall show minimal signs of stress cracking, swelling, and blistering when subjected to the chemicals listed below. All materials used shall minimize galvanic corrosion and/or cracking. Protective finish that impedes corrosion shall be free of visible defects. *NOTE:* “Minimum” is defined as not affecting form, fit or function of the NID enclosure.

8.8.2. Test Apparatus

The unpackaged NID enclosure shall be mounted in a vertical position to represent a typical field installation and thoroughly coated inside and out with the following chemicals: WD40 Water Displacement Lubricant, Power Wasp and Ant Spray, Oil Base House Paint, Sulfuric Acid (3% H₂SO₄) and Muriatic Acid (30% HCl)

8.8.3. Test Procedure

Test Procedure – The unpackaged NID enclosure shall be coated both inside and out. The chemicals shall be applied to fully surface coat the NID. The NID enclosure shall be examined every 7 days, for a period of 28 days, for signs of degradation. All hardware, if any, shall be torqued to a minimum of 20 lb-in (2.26 N-m) to test for integrity.

8.9. Fungus Resistance

8.9.1. Requirement

The NID enclosure shall not support fungus growth. An ASTM G-21 rating of 0 is required.

8.9.2. Test Apparatus

The unpackaged NID enclosure shall be placed on a clean table in an environmentally controlled chamber. Alternately, material component samples can be tested in place of a complete NID.

8.9.3. Test Procedure

The test shall be done in accordance to the latest revision of ASTM G21. The product shall be tested in its “as received” condition and there shall be no cleaning of parts prior to the fungus test.

9. Mechanical Testing

9.1. Impact

9.1.1. Requirement

The NID enclosure shall withstand an impact of 5 lb-ft. (6.8 N-m), as performed in UL746C, Section 24 “Resistance to Impact.” The NID enclosure shall resist and show minimal signs of peeling, warping, cracking, deformation and degradation of the material so as not to affect its overall function.

9.1.2. Test Apparatus

The unpackaged NID enclosure shall be mounted in a vertical position to represent a typical field installation. A pendulum or weight shall be located so that it impacts the device. The specific impact locations shall be determined with engineering judgement and will be those areas considered most likely to crack or be damaged. The test apparatus shall be inside a temperature controlled chamber.

9.1.3. Test Procedure

The test shall be conducted with the impact occurring where the enclosure is most likely to crack or be damaged. The impacts shall be performed on three different samples at temperatures of 77°F (25°C) and -22°F (-30°C)

9.2. Drop Test

9.2.1. Requirement

The unloaded (no components installed inside) NID enclosure shall withstand the 5 ft. (1.5m) drop test conditions listed below. The NID enclosure shall resist and show minimal signs of peeling, warping, cracking, deformation and degradation of the material so as not to affect its overall function.

9.2.2. Test Apparatus

The unpackaged NID enclosure shall be freely dropped 4 times from a height of 5 ft. (1.5m) onto a concrete surface. The drop may occur inside or outside of the temperature controlled chamber provided the temperature of the NID has stabilized and the drop occurs immediately on a concrete surface.

9.2.3. Test Procedure

The test shall be conducted with the drop contact occurring on the 4 corner locations, on three different samples at 77°F (25°C) and -22°F (-30°C).