

(320-15) Although Exposed Type AC Cable Is Required To Closely Follow The Surface Of The Building, It

(320-15) Although Exposed Type AC Cable Is Required To Closely Follow The Surface Of The Building, It is a critical consideration in electrical wiring installations, especially when adhering to safety codes and ensuring the longevity of the wiring system. Proper installation of AC (Armored Cable) is essential for both safety and aesthetic reasons, and understanding the nuances of its installation requirements helps electricians, contractors, and property owners achieve compliant and durable electrical setups. This article explores the key aspects of installing exposed type AC cables, the reasons behind these requirements, and best practices to ensure compliance with relevant electrical standards.

Understanding Exposed Type AC Cable

What Is Exposed Type AC Cable?

Exposed type AC cable, often referred to as armored cable, is a type of electrical wiring that features a protective metal sheath or armor. This armor provides mechanical protection against physical damage, making it suitable for exposed installations where the cable may be subject to impact or abrasion.

Key features of exposed type AC cable:

- Metal Armor: Usually made of steel or aluminum, providing durability.
- Flexible Design: Can be bent and shaped to follow building surfaces.
- Protection: Suitable for outdoor, industrial, or exposed indoor environments.
- Compliance: Meets specific electrical codes for exposed wiring.

Common Uses of Exposed AC Cable

- Outdoor wiring along building exteriors.
- Industrial installations requiring high durability.
- Areas where accidental impact is likely.
- Situations demanding quick and accessible wiring runs.

Why Must Exposed AC Cables Follow the Building Surface Closely?

Code Requirements and Safety Considerations

The NEC (National Electrical Code) and other standards specify that exposed AC cables should closely follow the surface of the building for several reasons:

- Minimize Physical Damage: Keeping cables close to surfaces reduces the risk of accidental impact or abrasion.
- Prevent Sagging or Loosening: Properly secured cables prevent undue tension and movement.
- Aesthetics and Neatness: Following surfaces creates a clean, professional appearance.
- Ease of Maintenance: Properly routed cables are easier to inspect and repair.

Implications of Not Following the Surface Properly

Failure to install AC cables properly can result in:

- Increased risk of physical damage leading to electrical faults.
 - Violations of electrical codes, resulting in penalties or failed inspections.
 - Shortened cable lifespan due to exposure to environmental factors.
 - Safety hazards such as electrical shocks or fire risks.
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Installation Guidelines for Exposed AC Cable

Securing the Cable to the Surface

Proper attachment involves using appropriate fasteners and supports:

- Clamps and Hangers: Use approved cable clamps at regular intervals.

- Spacing: Secure cables at intervals not exceeding the limits specified in the code, typically every 4.5 feet (1.4 meters).
- Placement: Attach cables directly to the building surface, ensuring they follow contours smoothly.

Maintaining Close Contact with the Surface

To ensure the cable remains close to the surface:

- Use clamps that hold the cable firmly without crushing it.
- Avoid sharp bends or kinks.
- Use supports to bridge gaps or irregular surfaces.
- Maintain a consistent distance from the surface to prevent sagging.

Protecting the Cable from Environmental Factors

Additional measures include:

- Using weatherproof fittings for outdoor installations.
- Applying protective covers or conduits where necessary.
- Ensuring the cable's armor is not damaged during installation.

Best Practices for Installing Exposed AC Cable

Preparation Before Installation

- Plan the Route: Map out the most direct and safe path along the building surface.
- Check Local Codes: Verify compliance with NEC or local electrical codes.
- Gather Materials: Ensure availability of clamps, supports, tools, and protective gear.

Step-by-Step Installation Process

1. Measure and Mark: Identify attachment points along the surface.
2. Cut and Prepare Cable: Cut to required lengths, strip ends if necessary.

3. **Attach Supports:** Install clamps at marked points, ensuring secure attachment.
4. **Lay and Secure Cable:** Carefully run the cable along supports, maintaining close contact with the surface.
5. **Check Alignment:** Ensure the cable follows the surface smoothly without slack or sag.
6. **Secure Connections:** If splicing or connecting, ensure proper termination and protection.
7. **Inspect Installation:** Confirm adherence to all safety and code requirements.

Tools and Materials Needed

- Cable clamps and straps
- Drill and screwdrivers
- Measuring tape
- Level or straightedge
- Protective gear (gloves, safety glasses)
- Weatherproof fittings (for outdoor installs)

Common Challenges and Solutions

Dealing with Irregular Surfaces

- Solution: Use flexible supports and adjustable clamps to accommodate surface contours.

Preventing Sagging

- Solution: Increase support points and ensure proper tension during installation.

Protecting Cables in Harsh Environments

- Solution: Use weatherproof armor, seal connections, and add protective coverings.

Ensuring Code Compliance

- Solution: Regularly consult electrical codes and standards, and when in doubt, seek professional advice.

Benefits of Properly Following the Building Surface

- Enhanced Safety: Reduces risk of damage, electrical faults, and accidents.
- Longevity of Installation: Properly secured cables resist environmental wear.
- Aesthetic Appeal: Neat and consistent appearance improves overall building aesthetics.
- Ease of Inspection and Maintenance: Clear pathways facilitate troubleshooting.

Conclusion

Installing exposed type AC cables requires attention to detail, adherence to safety standards, and an understanding of proper installation techniques. The requirement that such cables closely follow the surface of the building is rooted in safety, durability, and aesthetics. By carefully planning the route, securing the cable properly, and protecting it from environmental factors, electricians can ensure a compliant, safe, and professional installation. Remember, always consult local codes and standards, and when in doubt, seek professional guidance to maintain the highest safety and quality standards in electrical wiring projects.

Keywords: exposed type AC cable, AC cable installation, building surface, electrical code compliance, cable securing, outdoor wiring, armored cable installation, electrical safety, cable supports, NEC standards

Frequently Asked Questions

Why is it important for exposed type AC cable to closely follow the surface of the building?

Following the surface ensures proper support, reduces stress on the cable, and maintains safety and compliance with electrical codes.

What are the common methods to secure exposed type AC cable along building surfaces?

Methods include using cable clamps, straps, or conduit fittings that keep the cable flush against the surface while providing support and protection.

Are there specific building surfaces or materials where exposed AC cable should not be installed?

Yes, cables should not be installed on surfaces that are unstable, excessively hot, or chemically corrosive, as these can damage the cable or compromise safety.

What are the code requirements for the spacing of supports when installing exposed type AC cable?

Typically, supports should be installed at intervals not exceeding 4.5 feet (1.37 meters) for nonmetallic-sheathed cable, as per electrical codes, to prevent sagging and damage.

Can exposed type AC cables be installed outdoors without additional protection?

While they can be installed outdoors if rated for wet locations, they should be closely following the surface to prevent physical damage and exposure to environmental elements.

What are the potential hazards of not following the surface closely when installing exposed AC cable?

It can lead to physical damage, wear and tear, accidental disconnection, or failure to meet safety codes, increasing the risk of electrical hazards.

Are there any special considerations for installing exposed type AC cable in high-traffic or commercial areas?

Yes, additional support, protective coverings, or conduit may be necessary to prevent physical damage and ensure safety in high-traffic areas.

How does closely following the surface of the building affect the long-term durability of exposed AC cable?

It helps prevent mechanical damage, reduces strain, and minimizes exposure to environmental factors,

thereby extending the cable's lifespan.

What codes or standards govern the installation of exposed type AC cable to ensure it follows the building surface properly?

Standards such as the NEC (National Electrical Code) and local building codes specify requirements for support, attachment, and installation practices to ensure safety and compliance.

Additional Resources

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Understanding the nuances of electrical wiring codes and installation practices is essential for ensuring safety, compliance, and durability in building projects. One such critical aspect is the installation of Exposed Type AC (Armored Cable), often abbreviated as AC cable. The specific guideline highlighted in section (320-15) emphasizes that while exposed type AC cable is mandated to closely follow the surface of a building, this requirement carries several implications and considerations that are worth exploring in depth.

In this comprehensive review, we will analyze the purpose of this requirement, the technical details, the practical implications, and best practices for installation. We will delve into the reasons behind the regulation, the benefits of proper cable routing, and the potential pitfalls if these guidelines are not adhered to.

Understanding Exposed Type AC Cable: An Overview

What Is Exposed Type AC Cable?

Exposed Type AC cable, often called Armored Cable, is a type of electrical wiring that is protected by a metal sheath or armor. It is designed for installations where the cable is visible and not concealed within walls or ceilings. Commonly used in commercial and industrial settings, as well as in exposed outdoor environments, AC cable provides enhanced mechanical protection against physical damage.

Key features include:

- Metal Armor: Usually made of steel or aluminum, providing durability.
- Flexibility: Despite its armored nature, it can be bent and routed as needed.
- Ease of Installation: Comes with pre-installed conductors, making it straightforward to connect.
- Code Compliance: Recognized by the NEC (National Electrical Code) as an acceptable wiring method.

Applications of Exposed AC Cable

- Exterior building wiring
- Industrial machinery connections
- Situations where the cable runs along surfaces or structures
- Areas prone to physical damage

Why Is It Required To Follow The Surface of the Building Closely?

Regulatory and Safety Reasons

The NEC and other electrical codes specify that exposed AC cable should follow the surface of a building closely for several reasons:

- Minimize Physical Damage: Keeping cables close to surfaces reduces the risk of accidental impacts, snagging, or abrasion.
- Protection From Environmental Factors: Proper routing minimizes exposure to water, chemicals, or other environmental hazards.
- Prevent Tripping Hazards: When cables are neatly secured to surfaces, they are less likely to cause trips or falls.
- Maintain Aesthetic and Professional Appearance: Properly following surfaces ensures neatness, which can be crucial in commercial settings.

Technical Rationale

- Ensuring Mechanical Integrity: The closer the cable is to the surface, the less strain or bending it experiences, reducing wear over time.
- Facilitating Inspection and Maintenance: Proper routing makes future inspections and repairs easier.

- Compliance with Building Codes: Regulations often specify cable positioning to promote safety and standardization.

Implications of Not Following the Surface Closely

Ignoring the requirement to closely follow the building surface can lead to several issues:

- Increased Risk of Damage: Cables that are loosely run or sag away from surfaces are more vulnerable to impacts.
- Code Violations: Non-compliance can result in failed inspections, fines, or mandated rework.
- Safety Hazards: Loose or improperly secured cables can cause electrical shorts, fire hazards, or electrocution risks.
- Aesthetic Problems: Poor routing can lead to a cluttered or unprofessional appearance.

Technical Details and Best Practices for Installation

Securing the Cable

Proper securing of exposed AC cable involves:

- Using approved fasteners such as staples, clips, or straps.
- Placing fasteners at intervals specified by the NEC (typically every 48 inches, or as local code dictates).
- Ensuring fasteners do not damage the cable armor; using non-metallic or protective saddles if necessary.

Routing Considerations

When routing AC cable along building surfaces:

- Follow the designated walls, beams, or structural elements.
- Avoid sharp bends or kinks that could compromise the cable's integrity.
- Maintain a minimum clearance from hot surfaces, electrical equipment, or moving parts.
- Keep the cable accessible for future maintenance.

Use of Proper Fittings and Supports

- Employ fittings that are suitable for exposed installations.
- Use surface-mounted conduit or raceways if additional protection or aesthetic enhancement is desired.
- Ensure supports do not distort or compress the armor.

Protection From Environmental Elements

- In outdoor or wet locations, consider additional protection like weatherproof fittings.
- Use corrosion-resistant fasteners and supports.
- Avoid routing cables through areas prone to water accumulation or chemical exposure.

Code References and Standards

The section (320-15) of the NEC emphasizes that exposed Type AC cable should closely follow the surface of the building. This is generally aligned with the following standards:

- NEC (National Electrical Code) 310.15(B)(3): Regarding securing and supporting cables.
- NEC 338 (for Type AC cable): Specifies installation requirements, including securing methods.
- UL Standards: Underwriters Laboratories standards for cable durability and installation.

It is essential to verify local amendments and jurisdiction-specific codes, as they may impose additional or more restrictive requirements.

Practical Challenges and Solutions

While the requirement seems straightforward, practical challenges often arise:

- Obstacles on the Building Surface: Vent pipes, conduit outlets, or architectural features can hinder close routing.

Solution: Use flexible fittings or strategic routing to maintain proximity without causing damage.

- Irregular Surfaces: Uneven or textured surfaces can complicate installation.

Solution: Use appropriate fasteners or mounting brackets designed for irregular surfaces.

- Accessibility for Future Maintenance: Ensuring the cable is accessible without obstruction is key.

Solution: Plan routing during initial installation, avoiding tight spaces or areas prone to future modifications.

- Vibration and Movement: Dynamic building elements or external factors can cause cable movement.

Solution: Secure cables firmly with vibration-resistant fasteners.

Additional Considerations and Common Mistakes

- Over-tightening Fasteners: This can damage the armor or cable insulation.
- Inadequate Securing Intervals: Not following prescribed spacing can lead to sagging or stress points.
- Routing Through High-traffic Areas Without Protection: Can lead to physical damage.
- Ignoring Environmental Conditions: Failing to account for moisture, temperature, or chemical exposure can compromise the cable's lifespan.

Common mistakes include:

- Leaving exposed cable hanging loosely.
- Using incompatible fastening hardware.
- Routing cables through areas where they could be subjected to mechanical stress.

Summary and Final Recommendations

The requirement that exposed type AC cable must closely follow the surface of the building is rooted in safety, durability, and compliance. Proper installation practices are crucial to prevent damage, facilitate maintenance, and ensure the safety of building occupants.

Key takeaways include:

- Always secure AC cable at manufacturer-recommended intervals.

- Use appropriate fasteners and fittings designed for exposed installations.
- Route cables along surfaces that are structurally sound and free from hazards.
- Avoid tight bends, kinks, or unnecessary slack.
- Consider environmental factors, providing additional protection where necessary.
- Consult local codes and standards to ensure full compliance.

Final thoughts:

Adhering to this specific requirement not only ensures compliance with the NEC but also contributes to the overall safety and longevity of the electrical system. It reflects a professional approach to electrical installation that prioritizes safety, aesthetics, and functionality. Proper planning, attention to detail, and use of approved materials are the pillars of successful exposed AC cable installation along building surfaces.

In conclusion, the guideline (320-15) underscores the importance of meticulous routing and securing of exposed Type AC cables. By following these best practices, electricians and contractors can ensure their work meets code requirements, performs reliably, and maintains high safety standards throughout the life of the building.

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