

OTTAWA ELECTRICAL

Wiring

Circuit wiring, cable types, and wiring questions in
Ottawa homes

8 Expert Answers from Construction Brain

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Table of Contents

1. How do I identify aluminum wiring in my home?
.....
2. What is the lifespan of electrical wiring?
.....
3. What is pigtail wiring aluminum wiring?
.....
4. Is it safe to add insulation over knob and tube wiring?
.....
5. How much does it cost to replace aluminum wiring in Ottawa?
.....
6. What type of wire is used for residential electrical?
.....
7. What gauge wire do I need for a 20 amp circuit?
.....
8. Can aluminum and copper wiring be connected?
.....

How do I identify aluminum wiring in my home?

Aluminum wiring can be identified by a few key visual and documentary clues — and knowing whether you have it is an important safety step for any Ottawa homeowner.

Aluminum wiring was commonly installed in Canadian homes built between approximately **1965 and 1978**, when copper prices spiked and aluminum became a cost-effective alternative. If your home falls in that era, there's a reasonable chance you have it.

Check Your Electrical Panel First

The easiest starting point is your main electrical panel. Open the door (not the inner cover — leave that to a licensed electrician) and look at the wires connecting to your breakers. **Aluminum wiring is silver-colored**, while copper wiring is orange-brown or reddish. You may also see the letters **"AL"** printed directly on the wire jacket, which is a definitive identifier. Some wires will also be labeled "ALUMINUM" in full.

Look at Outlets and Switches

If you're replacing an outlet or switch (with the power OFF at the breaker), look at the wires connected to the terminals. Again, silver-colored wires indicate aluminum. You might also notice the outlet or switch itself is stamped **"CO/ALR"** or **"AL/CU"** — these markings mean the device was rated for aluminum wiring connections, which is a strong indicator the home was wired with aluminum.

Check Your Home's Documentation

Your **ESA Certificate of Inspection** or original building permits may reference the wiring type. Home inspection reports from when you purchased the property often flag aluminum wiring as well. If you have a pre-1978 home and no documentation, assume it's worth having a licensed electrician take a look.

Why It Matters

Aluminum wiring itself isn't illegal, but it requires specific handling. Aluminum expands and contracts more than copper with temperature changes, which can cause connections to loosen over time. Loose connections create **heat and arcing — a leading cause of house fires**. Insurance companies in Ottawa increasingly require either remediation or a certificate from a licensed electrician confirming the wiring is safe before they'll provide coverage.

The two accepted solutions in Ontario are:

- **Pigtailing** — splicing short copper leads onto each aluminum wire at every connection point using approved connectors (CO/ALR rated)
- **Full rewiring** — replacing all aluminum wiring with copper

Pigtailing typically runs **\$150–\$300 per outlet/connection** in the Ottawa market, while whole-home rewiring can range from **\$8,000–\$15,000** depending on home size.

What To Do Next

If you suspect or confirm aluminum wiring, don't panic — but do act. Have an ESA-licensed electrician inspect the system and assess the condition of all connections. This inspection will also help you understand what your insurance provider requires. Electrical Ottawa offers assessments for aluminum wiring situations, and all work is done to OESC standards with proper ESA permits.

For other renovation trades you might need during a rewiring project, vetted contractors are also available through the **Ottawa Construction Network at ottawaconstructionnetwork.com**.

Q2

What is the lifespan of electrical wiring?

Electrical wiring doesn't have a single expiration date, but most residential wiring lasts 50–70 years under normal conditions — though the type of wiring, installation quality, and how hard it's been worked all play a major role in how long it actually lasts safely.

Modern copper wiring (NMD-90 cable, the standard since the 1980s) is extremely durable and can last the lifetime of your home when properly installed and not overloaded. The wiring itself rarely "wears out" — problems arise from the insulation degrading, connections loosening over time, or the wiring being pushed beyond its rated capacity. A well-maintained copper system in a 1990s Ottawa home may need nothing more than occasional inspection for decades to come.

Where things get complicated is with older wiring types. Ottawa has a significant number of homes built before 1980 that may contain:

- **Knob and tube wiring** (pre-1950s): This ungrounded, two-wire system has cloth or rubber insulation that becomes brittle and cracked with age. It was never designed for modern electrical loads and becomes genuinely dangerous when covered with insulation (a common renovation mistake). Most Ottawa insurance companies now refuse to cover homes with active knob and tube, or charge significantly higher premiums.

- **Aluminum wiring** (roughly 1965–1978): Used during a copper shortage, aluminum wiring expands and contracts differently than copper, causing connections to loosen over time. Loose connections create heat, and heat creates fire risk. It's not a death sentence for your home, but it requires specific remediation — either CO/ALR-rated devices at every outlet or a process called "pigtail" with approved connectors.
- **Early plastic-sheathed wiring** (1950s–1970s): The insulation on this era's wiring degrades faster than modern NMD-90 and may be showing its age in older Ottawa homes.

From an Ontario Electrical Safety Code standpoint, there's no mandatory replacement schedule for wiring — but ESA inspectors and insurance underwriters pay close attention to wiring age and type. If you're buying an older Ottawa home, a pre-purchase electrical inspection is one of the smartest investments you can make. An ESA-licensed electrician can assess whether the wiring is safe, insurable, and up to current standards.

Signs your wiring may be past its prime include frequently tripping breakers, flickering lights, outlets that feel warm to the touch, a burning or plastic smell, or discoloration around outlet covers. Any of these warrant an immediate call to a licensed electrician — don't wait.

If your Ottawa home was built before 1975, it's worth having a licensed electrician assess your wiring. Electrical Ottawa offers free consultations to help you understand what you're working with and whether rewiring or remediation makes sense for your situation.

Q3

What is pigtail aluminum wiring?

Pigtail aluminum wiring is a safety repair method that connects short copper wire "pigtails" to aluminum branch circuits using special wire nuts, allowing safe connection to outlets and switches designed for copper wire.

This technique addresses the serious safety issues with aluminum wiring installed in many Ottawa homes between 1965-1975. Aluminum wiring expands and contracts more than copper as it heats and cools, causing connections to loosen over time. These loose connections create resistance, heat buildup, and potential fire hazards - aluminum wiring homes are 55 times more likely to have electrical fires.

How Pigtail Works

The process involves an ESA-licensed electrician installing short copper wire segments (pigtails) at each outlet, switch, and junction box. These copper pigtails are connected to the existing aluminum wiring using special AlumiConn or COPALUM connectors - never regular wire nuts, which can fail. The copper pigtails then connect

safely to outlets and switches, which are designed to work with copper wire.

This method is approved by the ESA and electrical insurance companies as a permanent repair. It's much more cost-effective than complete rewiring, typically costing \$150-300 per outlet/switch versus \$8,000-15,000 for whole-home rewiring in a typical Ottawa home.

ESA Requirements and Safety

In Ontario, pigtail wiring requires an ESA permit and inspection. Only licensed electricians can perform this work, as improper connections can actually increase fire risk. The electrician must use approved connectors and follow specific torque requirements outlined in the Ontario Electrical Safety Code.

Many insurance companies in Ottawa require aluminum wiring remediation before providing coverage. Pigtail wiring satisfies these requirements and often qualifies homeowners for insurance discounts. However, some insurers prefer complete copper rewiring, so check with your provider.

When Pigtail Wiring Isn't Enough

While pigtail wiring addresses most aluminum wiring hazards, complete rewiring may be necessary if the aluminum conductors themselves are damaged, corroded, or undersized for modern electrical loads. An electrical inspection can determine the best approach for your specific situation.

For a professional assessment of your aluminum wiring and a free estimate on pigtail wiring repairs, Electrical Ottawa's licensed electricians can evaluate your home's specific needs and ensure all work meets ESA safety standards.

Is it safe to add insulation over knob and tube wiring?

No, it is absolutely not safe to add insulation over knob and tube wiring. This creates a serious fire hazard that could put your family at risk and void your home insurance.

Knob and tube wiring was designed to dissipate heat through air circulation around the conductors. When you cover it with insulation, you trap that heat, causing the old cloth and rubber insulation around the wires to deteriorate even faster. This overheating can lead to arcing, sparking, and house fires. The wiring literally cannot cool itself properly when buried under insulation.

Insurance companies in Ontario are increasingly refusing coverage for homes with knob and tube wiring, especially when it's been covered with insulation. Many insurers now require complete removal before they'll provide a policy. Even if your current insurer hasn't dropped you yet, they likely will at renewal time if they discover insulated knob and tube during a claim investigation.

The **Ontario Electrical Safety Code** doesn't explicitly prohibit insulating over knob and tube, but it does require all electrical installations to be safe. ESA inspectors and insurance adjusters consider insulated knob and tube an unsafe condition. Most municipalities in the Ottawa area are also cracking down on this during home sales and renovations.

What you should do instead: Have the knob and tube wiring completely removed and replaced with modern Romex cable before adding any insulation. In Ottawa, knob and tube removal typically costs \$400-800 per circuit, depending on accessibility. For a typical 1,500 square foot home, expect to budget \$8,000-15,000 for complete rewiring.

Signs your knob and tube needs immediate attention: flickering lights, frequent blown fuses, outlets that don't work reliably, or any burning smells. If you're experiencing any of these symptoms, don't add insulation - call a licensed electrician immediately.

For a proper assessment of your knob and tube wiring and a quote for safe removal, contact Electrical Ottawa. We'll help you create a plan to upgrade your electrical system safely and maintain your insurance coverage.

How much does it cost to replace aluminum wiring in Ottawa?

Aluminum wiring replacement in Ottawa typically costs \$150-\$300 per outlet/switch, or \$3,000-\$8,000 for a whole-home rewire, depending on your home's size and the extent of aluminum wiring present.

Most Ottawa homes built between 1965-1975 have aluminum branch circuit wiring, which creates fire and safety risks due to aluminum's expansion properties and connection issues. The **Ontario Electrical Safety Code** now prohibits new aluminum wiring installations for branch circuits (though it's still allowed for service entrance cables).

Replacement options and costs in Ottawa:

For **partial aluminum wiring** (common in split-level homes where only some circuits are aluminum), you're looking at \$150-\$300 per outlet or switch replacement. This includes running new copper wire from the panel to each device, which requires ESA permits and inspection. A typical room with 4 outlets and 2 switches would cost \$900-\$1,800 to rewire.

For **extensive aluminum wiring** throughout the home, a whole-home rewire is often more cost-effective. In Ottawa, expect \$3,000-\$8,000 for a complete aluminum-to-copper conversion in an average 1,200-1,500 sq ft home. Larger homes (2,000+ sq ft) can reach \$10,000-\$15,000. This includes new copper wiring, updated outlets and switches, ESA permits, and inspection.

Insurance considerations make this work urgent for many Ottawa homeowners. Most insurance companies either refuse coverage or charge significantly higher premiums for homes with aluminum wiring. Some insurers require immediate remediation or policy cancellation. Getting quotes from multiple insurers after aluminum wiring replacement often results in substantial premium savings that help offset the rewiring costs.

ESA permit requirements apply to all aluminum wiring replacement work. Your licensed electrician must pull permits before starting, and ESA inspection is mandatory. The good news is that once completed and inspected, you'll have documentation proving your electrical system meets current safety standards.

Safety warning: Never attempt DIY aluminum wiring work. Aluminum connections require special techniques and materials (like CO/ALR rated devices). Improper connections create fire hazards that have caused numerous house fires across Ottawa.

For an accurate quote on your specific aluminum wiring situation, Electrical Ottawa offers free consultations where we assess the extent of aluminum wiring and provide detailed replacement options. We're ESA-licensed with full WSIB coverage, ensuring your rewiring project meets all Ontario safety requirements.

Q6

What type of wire is used for residential electrical?

Residential electrical systems in Canada primarily use copper wire with thermoplastic insulation, specifically NMD90 (Non-Metallic Dry, 90°C rated) cable for most interior applications.

The most common residential wire type is **Romex-style NMD90 cable**, which consists of insulated copper conductors bundled together with a plastic outer sheath. This cable contains a hot wire (black), neutral wire (white), and ground wire (bare copper or green), all wrapped in a protective outer jacket. The "90" designation means it's rated for 90°C operating temperature, making it suitable for modern electrical loads.

Wire gauge depends on the circuit amperage and application. For standard 15-amp circuits (most outlets and lights), **14 AWG copper wire** is used. For 20-amp circuits (kitchen counters, bathrooms, some appliances), **12 AWG copper wire** is required. Larger appliances need heavier wire - electric dryers typically use 10 AWG for 30-amp circuits, while electric ranges may require 6 AWG or larger for 40-50 amp circuits.

Specialized applications require different wire types. For wet locations like bathrooms or outdoor installations, **NMWU (wet location) cable** or individual THWN conductors in conduit are used. Underground installations require **direct burial cable** or conduit-protected wiring. Panel-to-panel connections often use **TECK cable** (armored cable) for added protection.

Older homes may have different wiring types that are no longer installed. Knob and tube wiring (pre-1950s) used individual cloth-wrapped wires, while aluminum wiring was briefly used in the 1960s-70s. Both present safety concerns and may need updating to meet current Ontario Electrical Safety Code requirements and insurance standards.

All residential wiring must meet ESA standards and be installed by licensed electricians for most applications. Wire selection depends on your specific circuit requirements, local conditions, and code compliance - factors that require professional assessment for safety and legal compliance.

What gauge wire do I need for a 20 amp circuit?

For a 20-amp circuit in Ontario, you need 12 AWG copper wire minimum. This is required by the Ontario Electrical Safety Code (OESC) and is non-negotiable for safety and code compliance.

The wire gauge must match the circuit breaker amperage to prevent overheating and fire hazards. **12 AWG copper wire is rated for 20 amps maximum**, while the smaller 14 AWG wire is only rated for 15 amps. Using undersized wire on a 20-amp breaker would create a dangerous situation where the wire could overheat before the breaker trips.

For most residential 20-amp circuits, you'll use 12-2 Romex cable (12 AWG with hot, neutral, and ground wires). If you're running a circuit that requires a neutral and ground to be separate at the panel, you might need 12-3 cable for specific applications like split receptacle circuits or three-way switch configurations.

Distance and voltage drop considerations also matter for longer runs. If you're running wire more than 100 feet from the panel, you may need to upsize to 10 AWG to compensate for voltage drop, though this is less common in typical residential applications.

Important safety reminder: Installing new circuits requires an ESA permit in Ontario and must be done by a licensed electrician. The wire sizing, connections, and circuit protection all need to meet OESC requirements and pass ESA inspection. DIY electrical work beyond simple outlet/switch replacements is illegal in Ontario and will void your home insurance if something goes wrong.

If you're planning to add a 20-amp circuit for appliances like microwaves, bathroom outlets, or workshop equipment, contact a licensed electrician to ensure proper installation and code compliance. **Electrical Ottawa's ESA-licensed electricians** can handle new circuit installation with proper permits and inspection for your Ottawa-area home.

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Can aluminum and copper wiring be connected?

Yes, aluminum and copper wiring can be safely connected, but only with special connectors designed for this purpose. Direct connection of aluminum to copper creates a fire hazard due to galvanic corrosion and different expansion rates.

The key issue is **galvanic corrosion** - when dissimilar metals touch in the presence of moisture, they create a chemical reaction that causes deterioration, loose connections, arcing, and potential fires. Additionally, aluminum and copper expand and contract at different rates with temperature changes, which can loosen connections over time.

Proper connection methods approved by the Ontario Electrical Safety Code include specialized wire nuts marked "AL/CU" or "CO/ALR" (copper-aluminum revised), and specific junction connectors like 3M Scotchlok or Ideal Twister AL/CU wire connectors. These connectors contain special compounds that prevent corrosion and maintain secure connections. Regular wire nuts marked only "CU" or with no marking should never be used with aluminum wire.

Professional installation is essential because improper connections are a leading cause of electrical fires in homes with aluminum wiring. Many Ottawa homes built between 1965-1975 have aluminum branch circuit wiring, which was common during a copper shortage. While aluminum wiring itself isn't inherently dangerous when properly installed and maintained, most problems occur at connection points.

ESA requirements mandate that any work involving aluminum wiring connections must be performed by a licensed electrician and typically requires a permit and inspection. This isn't a DIY project - the consequences of improper connections can be catastrophic.

If you have aluminum wiring in your Ottawa home, consider having it evaluated by a licensed electrician. Options include using proper AL/CU connectors at each junction, installing AFCI breakers for additional protection, or in some cases, complete rewiring with copper. Many insurance companies also require inspection certificates for homes with aluminum wiring.

For aluminum wiring assessment or safe copper-aluminum connections, contact a licensed electrician who understands the specific requirements and safety protocols for working with mixed metal electrical systems.

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