

Pool Bonding Requirements

Scope and structure

Pool bonding is electrical work and thus requires an electrical permit. Section 68 of the Manitoba Electrical Code (MEC) outlines rules for electrical installations and equipment in or adjacent to pools, tubs, and spas, focusing on reducing the risk of electrical shock in wet environments, and establishing an effective equipotential plane.

A pool shall be deemed to include:

- a) permanently installed and storable swimming pools;
- b) hydromassage bathtubs;
- c) spas and hot tubs;
- d) wading pools;
- e) baptismal pools;
- f) decorative pools; and
- g) splash pads.

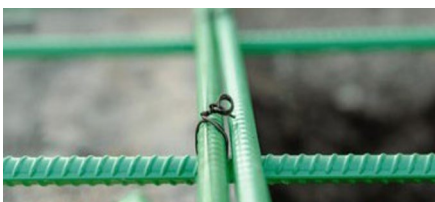
Bonding requirements MEC Rule 68-058

- Bonding conductors for pools shall be of copper and not smaller than No. 6 AWG.
- Direct earth burial (DB rated) bonding fittings must be used when installed underground.
- The bonding conductor shall be run to the panelboard supplying pool electrical equipment.
- Metal sheaths and raceways shall not be relied upon for bonding.
- Metal parts of the pool, non-current-carrying metal parts of electrical equipment and of other non-electrical equipment within 1.5 m of the pool such as piping, pool reinforcing steel, ladders, diving board supports, and conductive infrastructure shall be bonded together.



Unencapsulated structural reinforcing steel

Steel rebar provides strength to concrete and is commonly used for pools and perimeter surfaces. Unencapsulated structural reinforcing steel shall be bonded.



Encapsulated structural reinforcing steel

Epoxy-coated steel rebar provides enhanced, long-term corrosion resistance, especially in areas with high chloride content. Alternative bonding methods are required for pools and perimeter surfaces that use encapsulated reinforcing steel.

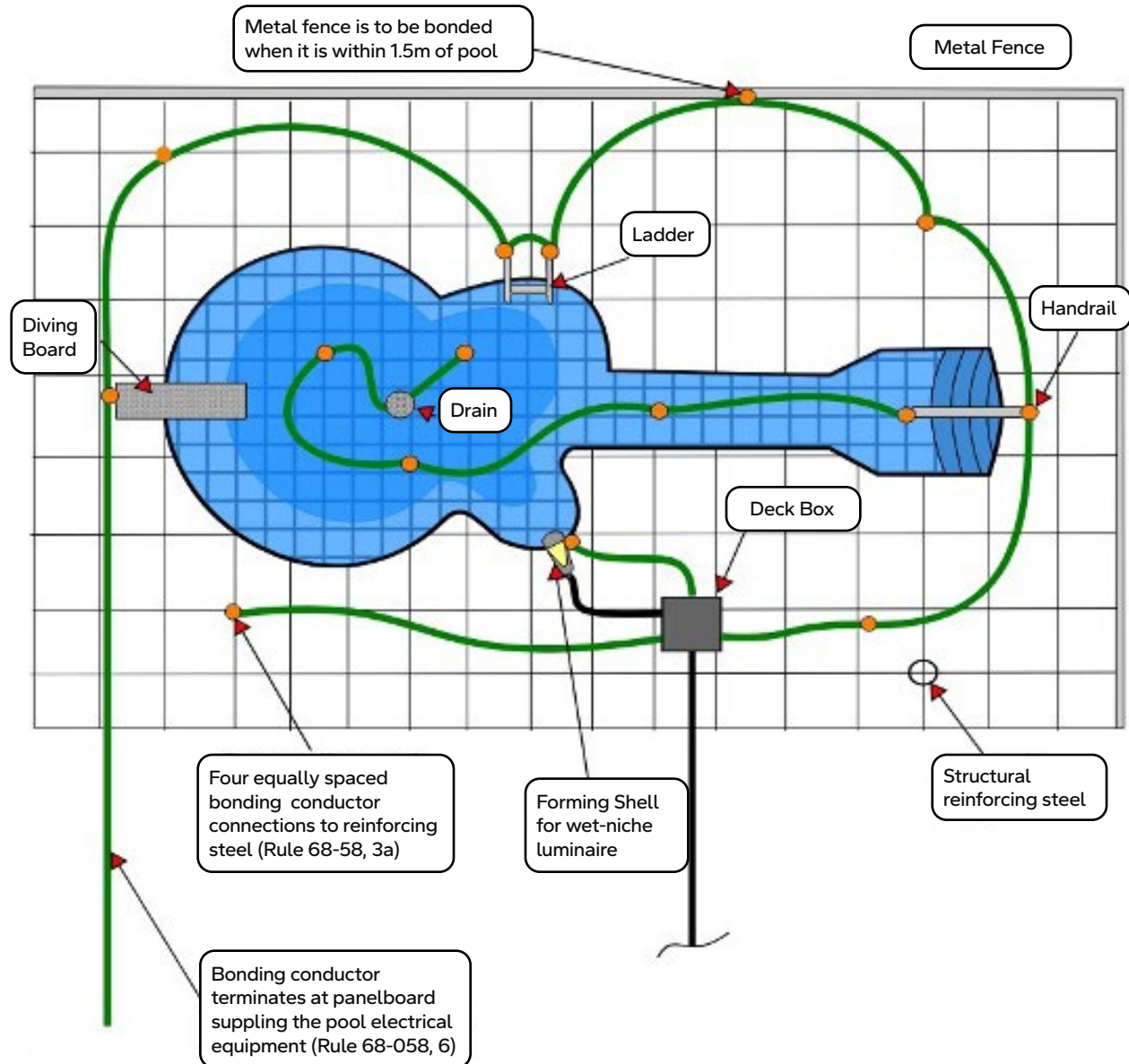


Non-conductive structural reinforcing fiberglass

Fiberglass rebar is corrosion resistant. It is ideal for use where it is exposed to weather and chemicals. Alternative bonding methods are required for pools and perimeter surfaces that use fiberglass reinforcement.

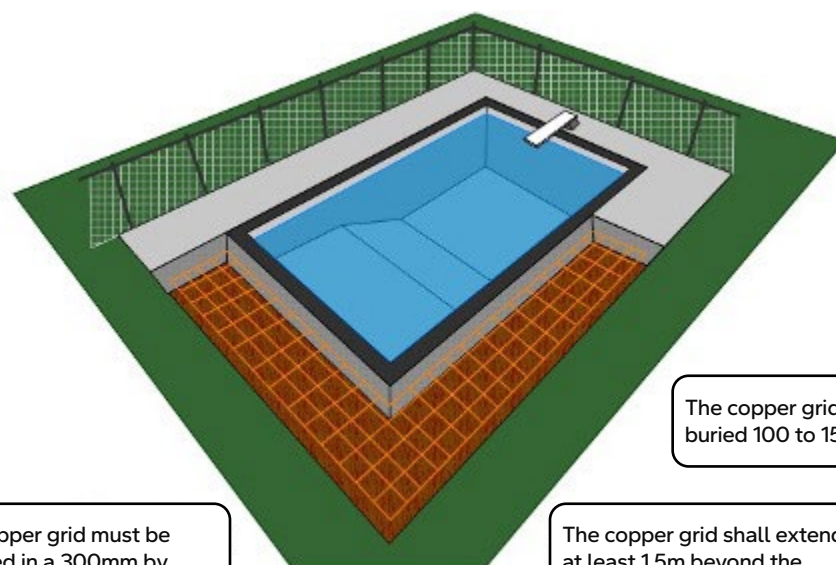
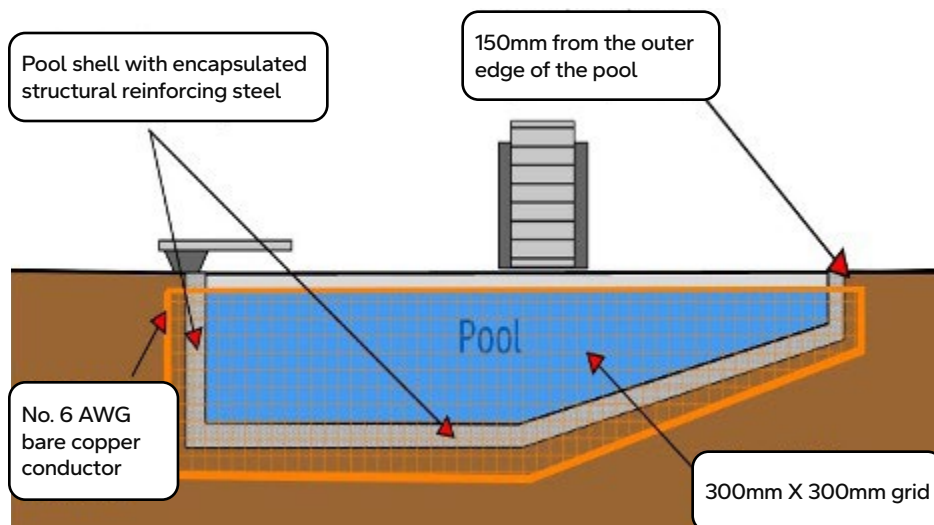
Bonding unencapsulated structural reinforcing steel pool shell and/or perimeter surface

- Bonding the unencapsulated, conductive structural reinforcing steel with a minimum of four connections equally spaced around the perimeter surface and pool.
- Metal sheaths and raceways shall not be relied upon for bonding. The single bonding conductor shall be run to the panelboard supplying pool electrical equipment.



Bonding encapsulated structural reinforcing steel/fiberglass pool shell and/or perimeter surface

- When encapsulated structural reinforcing steel or fiberglass is used in the construction of a pool shell or perimeter surface, a copper grid shall be constructed to form a continuous shield around and under the pool.
- The copper grid shall be constructed of minimum No. 6 AWG bare copper conductors bonded to each other using suitable connectors (such as direct bury rated split bolts or compression connectors) at all points of crossing of conductors.
- The grid shall be installed in a 300 mm by 300 mm equally spaced pattern +/-100 mm.
- The grid shall be installed around and under the pool and spaced no more than 150 mm from the outer contour of the pool shell.
- The perimeter grid shall extend 1.5 m horizontally from the outside of the pool shell.



The copper grid must be installed in a 300mm by 300mm network of #6 AWG

The copper grid shall extend at least 1.5m beyond the perimeter of the pool

The copper grid shall be buried 100 to 150mm deep

Bonding of a continuous metal pool shell



- A continuous metal pool shell made up of individual panels securely bolted or welded together shall be bonded in at least one location.

Non-conductive pool bonding



- No bonding requirements for non-conductive pools, such as fiberglass shells.
- If conductive pool equipment such as handrails, ladders, or fences are installed, they shall be bonded to the pool non-current carrying infrastructure and the associated electrical equipment.
- The perimeter decking around the non-conductive shell shall be bonded.

Permanent above-grade pool bonding



- A continuous metal pool shell made up of individual panels securely bolted or welded together shall be bonded in at least one location.
- A pool shell made up of non-conductive material, such as fiberglass or resin, is not required to be bonded.
- A pool shell made up of non-conductive material **and** with conductive materials (e.g., metal coping tracks for the liner bead, metal liner backings, and supports) shall be bonded.

The perimeter surface surrounding the permanent above ground pool shall be bonded using one of the three following methods:

1. Unencapsulated structural reinforcing steel
 - a) Bonding the unencapsulated, conductive structural reinforcing steel with a minimum of four connections equally spaced around the perimeter surface and pool.
 - b) The reinforced concrete shall extend at least 1.5 m horizontally from the outside of the pool shell.
 - c) Metal sheaths and raceways shall not be relied upon for bonding. The single bonding conductor shall be run to the panelboard supplying pool electrical equipment.

2. Encapsulated structural reinforcing steel or structural reinforcing fiberglass
 - a) When encapsulated structural reinforcing steel or fiberglass is used in the construction of a perimeter surface, a copper grid shall be constructed to form a continuous shield around and under the pool.
 - b) The copper grid shall be constructed of minimum No. 6 AWG bare copper conductors bonded to each other using suitable connectors (such as direct bury rated split bolts or compression connectors) at all points of crossing of conductors.
 - c) The grid shall be installed in a 300 mm by 300 mm equally spaced pattern +/- 100 mm.
 - d) The grid shall be installed around and under the pool and spaced no more than 150 mm from the outer contour of the pool shell.
 - e) The perimeter grid shall extend at least 1.5 m horizontally from the outside of the pool shell.

3. Non-conductive perimeter surface
 - a) Perimeter surface bonding is not required when a permanent above ground pool is separated from the earth or other conductive surfaces or raised on non-conductive support.
 - b) The non-conductive surfaces shall extend not less than 1.5 m from the outer shell of the permanent above ground pool.
 - c) Examples of non-conductive material include but are not limited to wood, plastic, composite decking, and fiberglass.

Water bonding

Where none of the bonded parts are in direct contact with the pool water, a corrosion resistant conductive surface that always exposes not less than 58 cm² or surface area of the pool water.



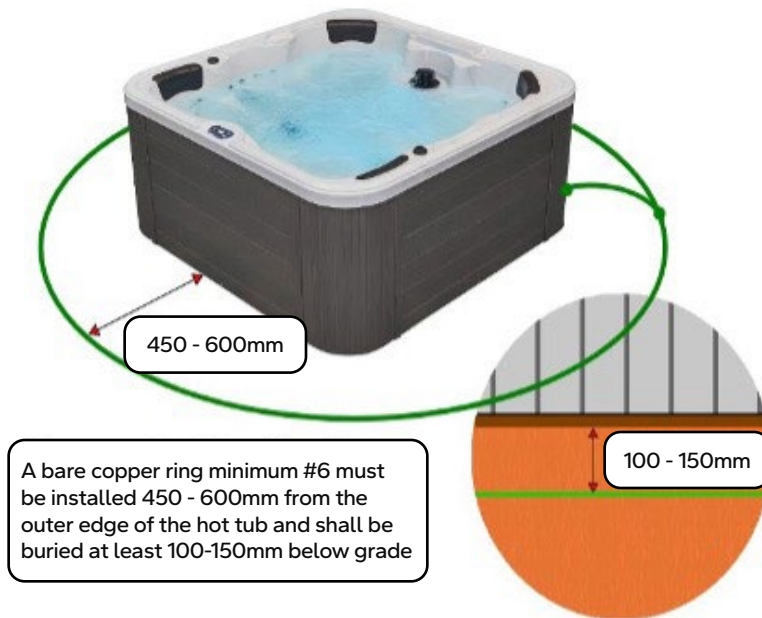
- The intent of a water bonding device is to reduce the potential difference between the pool water and surrounding surfaces.
- Manufactured spas and hot tubs do not require water bonding devices.
- Handrails, ladders and other accessories that are bonded and in direct contact with the pool water may satisfy the requirements of this rule if corrosion resistant and not less than 58 cm² in surface area.

Examples of bonding connections for unencapsulated structural reinforcing steel and metal parts of the pool equipment

Approved electrical bonding connections are required, including direct earth burial (DB rated) fittings when installed underground.



Hot tub bonding



- A copper bonding ring is required around ground-level hot tubs in accordance with MEC 68-058 3) c)
- The copper ring for spa or hot tub installations will not be required when:
 - a non-conductive perimeter surface around the spa or hot tub is separated from the earth or other conductive surfaces or,
 - the perimeter surface is installed on raised non-conductive supports and is electrically separated from the pool structure if it is conductive

Note: The perimeter surfaces noted above shall extend at least 1.5 m beyond the spa or hot tub on all accessible sides.

Deck/perimeter surfaces bonding surrounding a spa or hot tub

- The perimeter surface surrounding a spa or hot tub shall comply with MEC 68-058 3) a) when installed on poured concrete slab with conductive structural reinforcing steel.
- Hot tubs installed on patio stones, small concrete pads, or on direct earth shall install a copper ring to comply with MEC 68-058 3) c).
- Perimeter surface bonding is not required when hot tubs are separated from the earth or other conductive surfaces or raised on non-conductive support.
- The non-conductive surfaces shall extend not less than 1.5 m from the outer shell of the spa or hot tub.
- Examples of non-conductive material include but are not limited to wood, plastic, composite decking, and fiberglass.



Summary

Pool shell bonding:

Installation method	MEC requirement
Pool installed with poured concrete and unencapsulated reinforcing steel	Bonded at four equally spaced connections per Rule 68-058 4) a)
Continuous metal shell made up of individual panels bolted together	Bonded at one point per Rule 68-058 4) b)
Pool installed with either fibreglass rebar, or fibre reinforced concrete	Copper grid is required per Rule 68-058 4) c)
Pool installed with poured concrete (fiber concrete)	Copper grid is required per Rule 68-058 4) c)
Pool installed with poured concrete and encapsulated reinforcing steel	Copper grid is required per Rule 68-058 4) c)

Pool perimeter bonding:

Installation method	MEC requirement
Installed with poured concrete and unencapsulated reinforcing steel	Bonded at four equally spaced connections per Rule 68-058 3) a)
Installed with fibreglass rebar or fibre reinforced concrete	Copper grid is required per Rule 68-058 3) b)
Installed with poured fibre concrete	Copper grid is required per Rule 68-058 3) b)
Patio stones or pavers around the pool as the decking	Copper grid is required per Rule 68-058 3) b)
Installed with poured concrete and encapsulated reinforcing steel	Copper grid is required per Rule 68-058 3) b)
Installed with wooden or composite decking (non-conductive). Decking must extend at least 1.5 m beyond the spa or hot tub on all accessible sides.	No bonding required for the deck

Permanently installed spas and hot tubs bonding

Installation method	MEC requirement
Installed on poured concrete with unencapsulated reinforcing steel	Bonded at four equally spaced connections per Rule 68-058 3) a)
Installed on poured concrete with encapsulated reinforcing steel	Copper grid is required per Rule 68-058 3) c)
Installed on patio stones, pavers, or on the ground	Copper grid is required per Rule 68-058 3) c)
Installed on wooden or composite decking (non-conductive) that extends 1.5 m beyond the outer contour	Copper grid is not required
Storable/seasonal spas and hot tubs	68-058 applies to permanently connected spas and hot tubs. Storable/seasonal spas and hot tubs shall be installed per the manufacturer's instructions.

Non-conductive pool shells

Installation method	MEC requirement
Non-conductive pool shell (fibreglass composite or resin)	No requirement
Concrete pool shell with vinyl liner	68-058 4) a) or c)
Continuous metal shell made up of individual panels bolted together with vinyl liner	68-058 4) b)

The bonding installation must be inspected and approved before concrete is poured or the bonding is otherwise covered. Bonding is a critical component of the electrical installation and requires a separate inspection. Where the bonding installation is covered prior to its inspection and approval, removal of the covering, including concrete, may be required to expose the bonding system components to facilitate the inspection.

Alternatively, if pool bonding is covered prior to inspection, the permit applicant may retain the services of a qualified engineer to provide stamped documentation detailing the installation methods and stating that the bonding is Code compliant.

Even if there is no pool-associated electrical equipment in the pool vicinity, such as a pump, heater, lighting, etc., non-electrical metal components such as re-bars, slide ladders, handrails, etc. must still be bonded and an electrical permit is required for the bonding installation.