

EV Charger Pole Housing: How to Spec One Correctly

A practical guide for engineers, architects, and procurement officers specifying EV charger pole housings for commercial, municipal, and fleet installations.

The demand for electric vehicle charging infrastructure is accelerating across every sector — commercial real estate, municipal parking, corporate campuses, fleet yards, and highway corridors. As a result, specifiers are increasingly being asked to document EV charger pole housings in construction documents and equipment schedules, often for the first time.

Getting the specification right matters more than it might appear. An EV charger pole housing is not simply a pole with a charger bolted to it. It is a coordinated assembly of structural, electrical, and enclosure components that must satisfy the utility, the AHJ (Authority Having Jurisdiction), the equipment manufacturer, and the end user — simultaneously. Undersized conduit, inadequate grounding, a housing that traps heat, or a base that isn't rated for the wind load can each trigger a failed inspection, a warranty void, or a costly field change.

This guide walks through every specification decision point, from charger type selection through structural requirements, conduit and electrical coordination, enclosure ratings, and installation standards. It is written for specifiers who need to get this right the first time.

Who Should Read This Guide

Civil engineers, electrical engineers of record, landscape architects, urban planners, facilities managers, and procurement officers involved in specifying or reviewing EV charging infrastructure for commercial, municipal, fleet, or mixed-use projects.

What Is an EV Charger Light Pole Housing?

An EV charger pole housing is the integrated structural and enclosure assembly that supports and protects an electric vehicle charging unit in an outdoor installation while also supporting a light pole and ancillary items. It typically consists of:

- **A pole shaft** — steel, aluminum, or fiberglass; straight or tapered; mounted to a structural cabinet
- **A base enclosure or foundation housing** — providing conduit entry, cable management, grounding terminations, and in some cases a metering compartment that is anchor-bolt mounted to an in-ground footing
- **A charger mounting system** — side-arm, wall-mount bracket, or integrated mounting plate sized for the specific EVSE unit
- **Conduit and wiring infrastructure** — from the service point underground, thru the cabinet and to the charger output

The term 'EV charger pole housing' is used interchangeably with 'EVSE pole,' 'charging station pole,' and 'EV charging pedestal' in the industry, though pedestals typically refer to shorter, non-pole-mounted configurations. For the purposes of this guide, we focus on pole-mounted EVSE in parking field, corridor, and fleet yard applications.

Step 1: Determine Charger Level and Power Requirements

The single most important upstream decision in specifying an EV charger pole housing is the charger level, because it drives every downstream requirement — conductor size, conduit fill, breaker rating, pole load, and foundation design.

Charger Type	Power Output	Typical Circuit	Connector Standard	Best For
Level 1 (AC)	1.4 – 1.9 kW	120V / 15–20A	SAE J1772	Overnight residential; rarely specified commercially
Level 2 (AC)	3.3 – 19.2 kW	208–240V / 30–80A	SAE J1772 / CCS	Workplace, retail, municipal, multi-family
DC Fast Charge (DCFC)	50 – 350 kW	480V 3-phase / 125–600A+	CCS / CHAdeMO / NACS	Highway, fleet, high-turnover commercial

Level 2 is the most common specification for commercial parking and workplace installations. DCFC is specified where session time is critical — highway rest stops, fleet yards with high daily mileage vehicles, and transit hubs. The pole housing, structural design, and electrical infrastructure differ significantly between the two.

Common Specification Error

Specifying a Level 2 pole housing and later field-upgrading to DCFC is not feasible without replacing the pole, foundation, conduit, and service infrastructure. If there is any possibility of future DCFC at a location, design the civil and electrical infrastructure for DCFC from the outset, even if the initial charger is Level 2.

Step 2: Specify the Structural Assembly

Pole Material and Configuration

EV charger poles are available in steel, aluminum, and fiberglass. Steel is the most common for commercial applications due to its strength and cost. Aluminum is preferred in coastal environments. Fiberglass is used in high-corrosion or RF-sensitive installations where metal poles would interfere with wireless equipment.

Pole configuration options include:

- **Single-head pole** — one charger per pole; most common for Level 2 in standard parking bays
- **Dual-head pole** — two chargers per pole via a center-mounted configuration; reduces infrastructure cost per charging port in high-density layouts
- **Quad-head pole** — four chargers mounted to a structural cabinet; pole serves as a support for lighting, Wi-Fi, security systems, etc. rather than charger mount

Structural Load Calculation

Every EV charger pole installation requires a structural load calculation. The pole and foundation must be designed for:

- Dead load: pole weight + charger unit weight + cable management hardware
- Wind load: effective projected area (EPA) of the pole shaft, charger enclosure, and any mounting arms or cable management hardware at the design wind speed per ASCE 7-22
- Impact load: if the installation is in or adjacent to a vehicle travel lane or parking overhang zone, AASHTO vehicle impact requirements may apply or impact bollards may be required

For Level 2 installations, standard catalog pole sizes (typically 4" round or square shaft, 0.125" wall, 10–14 ft mounting height) are usually adequate. For DCFC, the charger enclosure presents a significantly larger EPA and the pole must be engineered accordingly — catalog solutions are often insufficient.

Foundation Type

- **Direct burial** — pole set in concrete; simplest and lowest cost. Requires breakaway design if vehicle impact is possible.
- **Anchor bolted cabinet** — preferred for Level 2 & DCFC and any installation where future pole replacement or electronic add-ons are anticipated. Bolt circle and projection are specified by the structural engineer of record.

Step 3: Specify the Electrical System

The electrical specification for an EV charger pole housing is where most specification errors occur. The following elements must each be documented and coordinated with the electrical engineer of record.

Service Entry and Panel Coordination

Each EV charger circuit originates at a dedicated overcurrent protective device (OCPD) in the service panel or sub-panel. NEC Article 625.40 requires that EVSE be supplied by a dedicated branch circuit. The specification must document:

- Panel or sub-panel designation and available capacity
- Overcurrent protection rating (typically 125% of the continuous load per NEC 625.42)
- Circuit voltage and phase (120/240V single-phase for Level 2; 208/480V three-phase for DCFC)
- Distance from panel to farthest pole (for voltage drop calculation)

Conductor Sizing and Voltage Drop

Voltage drop is one of the most commonly under-specified parameters in EV charging infrastructure. NEC permits a maximum of 3% voltage drop on branch circuits, but EVSE manufacturers often require tighter tolerances — some specify no more than 2% at the charger terminals. At DCFC power levels and long feeder runs, this can require conductor sizes significantly larger than the minimum ampacity calculation would suggest.

Document the following in the electrical specification or single-line diagram:

- Conductor size (AWG or kcmil) for each circuit
- Conduit type and size (EMT, RMC, Schedule 40 PVC below grade)
- Calculated voltage drop at full load at the farthest point
- Neutral conductor requirements (Level 2 EVSE with display screens or network equipment may require a neutral)

Conduit Sizing and Fill

This is the most common source of field problems in EV charging installations. Conduit fill must account for all conductors in the run, including equipment grounding conductors (EGC), and must comply with NEC Chapter 9, Table 1 (maximum 40% fill for three or more conductors).

Specification	Requirement / Typical Range
Level 2 — 48A circuit	2" EMT minimum (above grade); 2" Schedule 40 PVC (below grade)
Level 2 — 80A circuit	2.5" EMT minimum; 3" PVC below grade recommended
DCFC — 125A circuit	3" EMT minimum; 3.5" PVC below grade
DCFC — 200A+ circuit	4" EMT minimum; consult EE of record for derating
Network/data conduit	1" EMT minimum, separate from power conduit
Conduit sweep radius	Per NEC 358.24; 12x conduit trade size minimum
Underground depth	Per NEC 300.5, Table 300.5; 24" min for PVC under pavement

Grounding and Bonding

NEC Article 625 and Article 250 both apply to EVSE installations. Grounding and bonding requirements include:

- Equipment grounding conductor (EGC) in each conduit run, sized per NEC Table 250.122
- Grounding electrode system connection at the service point
- Bonding of the pole shaft, base enclosure, and charger housing to the EGC
- Ground fault circuit interrupter (GFCI) protection per NEC 625.22 where required
- Lightning protection bonding if the installation is in a high-keraunic level area or on an exposed site

Metering

Many utilities require revenue-grade metering on EVSE circuits above a threshold ampacity, or where the charging load will be billed back to tenants or users. Metering requirements vary by utility and jurisdiction. Confirm with the serving utility during design whether:

- Utility-owned metering is required at the service entrance
- Sub-metering at each charger is required or permitted for tenant billing
- A dedicated meter socket in the pole base housing is required
- CT (current transformer) cabinets are required at service entrance for DCFC

Step 4: Specify the Pole Housing Enclosure

Enclosure Rating

The pole housing enclosure — the base compartment that houses conduit terminations, splices, grounding lugs, and potentially network or metering equipment — must carry an appropriate NEMA or IP rating for the installation environment:

- **NEMA 3R / IP54** — rainproof; suitable for most commercial parking and streetside installations
- **NEMA 4 / IP65** — watertight; required in coastal, high-humidity, or pressure-wash environments
- **NEMA 4X / IP66** — corrosion-resistant and watertight; required in salt-air, chemical, or severe outdoor environments

Access and Security

The enclosure access provisions must balance maintenance access with tamper resistance. Specify:

- Door type: hinged, removable panel, or cylinder lock
- Hardware material: stainless steel for coastal or high-humidity environments; zinc-plated or powder-coated for standard environments

- Keying: specify a common key system if the installation includes multiple poles across a campus or portfolio
- Tool-access requirement for tamper resistance (e.g., requires T-handle or specialty bit)

Thermal Management

Power electronics in sealed enclosures generate heat. Network-connected EVSE components, power conditioning equipment, or metering hardware housed in the base enclosure can reach temperatures that shorten service life if the enclosure is not properly vented. Specify:

- Passive venting via filtered louvers (adequate for most Level 2 installations without active electronics in the base)
- Active cooling (thermostatically controlled fan) for base enclosures housing network equipment or in high-ambient-temperature climates
- Solar shielding or reflective finish for bases in full sun exposure in southern climates

Cable Management

The charging cable and connector present a user-experience and durability challenge that is often overlooked in the specification. Specify:

- **Cable length** — 20–25 ft is standard for J1772 and CCS; confirm with EVSE manufacturer
- **Cable management holster or cradle** — prevents cable drag on pavement, which is the most common cause of cable damage
- **Vandal resistance** — cable retention systems or coiled cable management in high-vandalism environments

Step 5: Coordinate with the AHJ and Utility

EV charging infrastructure is subject to permitting, inspection, and utility interconnection requirements that vary significantly by jurisdiction. Do not assume that a design that passed inspection in one municipality will be approved in another. The following coordination steps should occur during the design phase, not at permit submission:

Authority Having Jurisdiction (AHJ)

- Confirm whether the AHJ has adopted NEC 2020 or NEC 2023 (Article 625 was substantially revised in 2020)
- Confirm local amendments or additional requirements beyond the adopted NEC edition
- Confirm permit requirements: electrical permit only, or combined civil/electrical/building permits
- Confirm inspection requirements: rough-in inspection at conduit stage, final inspection at charger installation

Serving Utility

- Submit a utility interconnection application early — processing times range from 2 weeks to 6+ months for DCFC
- Confirm utility tariff: some utilities offer EV-specific demand rates that affect equipment and metering design
- Confirm service entrance equipment requirements (meter socket type, CT cabinet, disconnect requirements)
- For DCFC, confirm whether a transformer upgrade is required and the timeline and cost responsibility

Timeline Risk

Utility interconnection approval and transformer upgrades are the most common causes of EV charging project delays. On DCFC projects, begin utility coordination at schematic design, not at permit submission. Budget 3–6 months for utility approval on new service installations.

Complete Specification Checklist

Use this checklist when writing or reviewing an EV charger pole housing specification:

Structural

- Charger level and power output confirmed
- Pole material specified (steel / aluminum / fiberglass)
- Pole configuration confirmed (single-head / dual-head)
- Wind load calculation per ASCE 7-22 completed
- Vehicle impact protection addressed (bollards, breakaway design, or AASHTO rating)
- Foundation type specified (direct burial / anchor bolt / surface mount)
- Anchor bolt circle, quantity, grade, and projection documented (if anchor bolt)

Electrical

- Dedicated branch circuit per NEC 625.40 confirmed
- OCPD sized at 125% continuous load per NEC 625.42
- Conductor size and type documented
- Voltage drop calculated and confirmed within manufacturer tolerance
- Conduit type, size, and fill verified per NEC Chapter 9
- Underground conduit depth per NEC Table 300.5
- EGC sized per NEC Table 250.122
- GFCI protection per NEC 625.22 addressed
- Metering requirements confirmed with utility

Enclosure

- NEMA or IP rating specified for environment
- Access door type and hardware specified
- Keying system specified
- Thermal management addressed
- Cable management holster or cradle specified

Coordination

- AHJ confirmed: NEC edition adopted, local amendments, permit requirements
 - Utility interconnection application submitted
 - Utility tariff reviewed for EV-specific rate availability
 - Transformer capacity confirmed
-

Frequently Asked Questions

Can I spec a standard light pole base for an EV charger installation?

Only for very low-power Level 2 installations where the pole will carry no electronics in the base and the conduit fill is within standard parameters. For any installation with network-connected EVSE, metering in the base, or DCFC, a purpose-built EV charger pole housing is required. The conduit management, grounding provisions, and enclosure ratings of a standard light pole base are typically inadequate.

How many EV chargers can share a conduit run?

Multiple charger circuits can share a conduit if the conduit is sized for the combined fill per NEC Chapter 9. However, each charger must have a dedicated circuit (dedicated OCPD and dedicated conductors). Shared neutrals are not permitted for EVSE circuits. In practice, most installations home-run each circuit from panel to pole, or use a sub-panel adjacent to the charging field to reduce home-run conduit sizes.

What is the service life expectation for a correctly specified EV charger pole housing?

A properly specified and installed steel or aluminum EV charger pole housing, with appropriate finish for the environment, should achieve a 25–30 year structural service life. EVSE technology cycles faster — plan for charger unit replacement at 8–12 years without replacing the pole and civil infrastructure, which is why properly sized conduit and a well-designed base are critical long-term investments.

Is ADA compliance required for EV charging stations?

Yes. ADA Standards for Accessible Design and the ABA Accessibility Standards both require accessible EV charging spaces. The U.S. Access Board published updated EV charging accessibility guidelines that specify reach range requirements, surface requirements, and accessible route provisions. The number of required accessible spaces scales with the total number of charging spaces provided. Confirm current requirements with the AHJ, as guidelines have been updated recently.

Need Spec Language, CAD Details, or a Submittal Package?

We provide project-specific EV charger pole housing submittals including structural calculations, AutoCAD base details, conduit schedules, and specification section language ready for incorporation into your project manual. Contact us to request a submittal package or to discuss your project requirements.

This article is part of our Specifier's Resource Library. Related guides: [Intelligent Pole Base: A Specifier's Guide](#) | [Parking Lot Technology Enclosure: Buyer's Guide](#) | [Weatherproof Outdoor Enclosure Materials & Ratings](#)