AccessFixtures
High-Performance Lighting Solutions

SECU Solar Security Bollard Light

Engineering & Installation Guide

October 28, 2026

Overview

SECU is a solar-powered LED bollard light that slides over a concrete-filled 5-inch Schedule 80 steel pipe, turning a vehicle-rated steel bollard into a lit, off-grid perimeter post. The steel core stops the vehicle; the SECU body sleeve and solar head add light with no wiring, no electrician, and no utility bill.

This guide explains the engineering behind the system and the installation sequence, so your contractor and structural engineer can plan the work before excavation begins.

Supplied by Access Fixtures	Purchased or arranged separately by the customer
SECU body sleeve (die-cast aluminum, marine-grade powder coat)	5" nominal Schedule 80 steel pipe
SECU solar head with LiFePO4 battery and controller	Rebar cage or heavy center rebar
Tamper-resistant hardware for securing the head	Structural concrete for the footing and pipe core
	Foundation design by a licensed structural engineer (PE)

Structural core

The strength of a SECU bollard comes from its 5-inch nominal Schedule 80 steel pipe, which becomes a composite column once it is filled with concrete over a rebar cage and anchored in an engineered footing.

Property	Specification
Pipe	5" nominal Schedule 80 structural steel (ASTM A53 Grade B or equivalent)
Outside diameter	5.563 in (141.3 mm)
Wall thickness	0.375 in (9.53 mm)
Section modulus	7.43 in^3, 36.3% more bending strength than standard Schedule 40 pipe
Bare steel weight	20.8 lb per linear foot

Height profiles

Choose the pipe height first, because it sets the SECU model and the foundation size.

Profile	Pipe above grade	Body height (excl. head)	Overall height	Best for
Option 1: Security (recommended)	36 in	44 in	50.5 in	High-risk sites. The compact profile limits a vehicle's ability to override or climb the post and shortens the lever arm against the foundation.
Option 2: High visibility	48 in	56 in	62.5 in	Loading docks and entrances with heavy truck traffic. Higher rotational force at grade requires a larger concrete foundation.

Spacing and array geometry

Set adjacent SECU bollards 48 to 54 inches apart, center to center, which keeps every gap between 36 and 48 inches clear.

Two measurements govern the layout. The clear gap is the open space between the outer faces of adjacent SECU bodies. Center-to-center equals the clear gap plus one 6.50-inch sleeve diameter, and it is the figure crews mark out on site.

Rule	Clear gap (face to face)	Center to center	Why it matters
Anti-ram maximum	48 in	54.5 in	Wider gaps let a compact car navigate or force its way through the line.
Accessibility minimum	36 in	42.5 in	Keeps an ADA accessible route open for wheelchairs, mobility devices, and pedestrians.
Recommended layout	41.5 to 47.5 in	48 to 54 in	Sits inside both limits: a clear walking path that still stops a standard passenger car from bypassing the line.

Foundation, concrete, and reinforcement

The steel pipe must be encased in a continuous concrete pier footing sized to the soil, because the footing is what transfers impact energy into the ground.

Soil condition	Recommended footing	Minimum depth	When it applies
Standard or cohesive soils (firm clay, compacted glacial till)	16 to 18 in diameter pier	Equal to above-grade height: 36 in for Option 1, 48 in for Option 2	Stable soils that naturally resist lateral displacement and overturning
Low-cohesion soils (loose sand, silt, gravel, high water table)	24 in minimum diameter pier	Often 6 to 12 in beyond above-grade height (42 to 48 in for a 36 in pipe)	Ground that lacks the density to keep the foundation from plowing through the soil on impact
Ultra-low cohesion soils or high-risk storefronts	Continuous concrete trench (grade beam) tying multiple bollards together	Per structural engineer	Unsupportive soil, or where the highest anti-ram performance is required; impact force spreads across the entire line

Concrete and rebar

- **Footing concrete:** structural-grade, 3,000 PSI minimum compressive strength at 28 days; 4,000 PSI preferred for severe vehicle-threat zones.
- **Core fill:** fill the pipe completely to its top rim with the same structural concrete or a high-strength cement matrix. A full core prevents local wall buckling and inward kinking on impact.
- **Rebar:** an internal rebar cage or heavy center rebar is required to resist tension across the grade-line pivot point.

Impact performance

When filled and anchored in an engineered footing matched to the soil class, the 5-inch Schedule 80 composite core is engineered to stop a 4,000 to 5,000 lb passenger car or mid-size SUV traveling up to 20 mph.

Low-speed perimeter barriers are rated to ASTM F3016/F3016M, Standard Test Method for Surrogate Testing of Vehicle Impact Protective Devices at Low Speeds. The test uses a 5,000 lb surrogate vehicle and rates results by speed and by penetration past the barrier face.

Rating	Meaning
S20	Impact at 20 mph with the 5,000 lb surrogate vehicle
P1	Less than 1 ft of penetration past the bollard face

Storefront barrier assemblies built with concrete-filled structural steel of equivalent wall thickness (0.25 to 0.375 in) have obtained certified ASTM F3016 S20 P1 ratings. The SECU core, with its 0.375 in wall, concrete fill, and rebar, matches that construction. Your structural engineer verifies the site foundation against ASTM F3016 test data.

Cross-section: five layers at the grade line

At the grade line, a SECU bollard is a concentric stack of five materials, each with one job, listed here from the center outward.

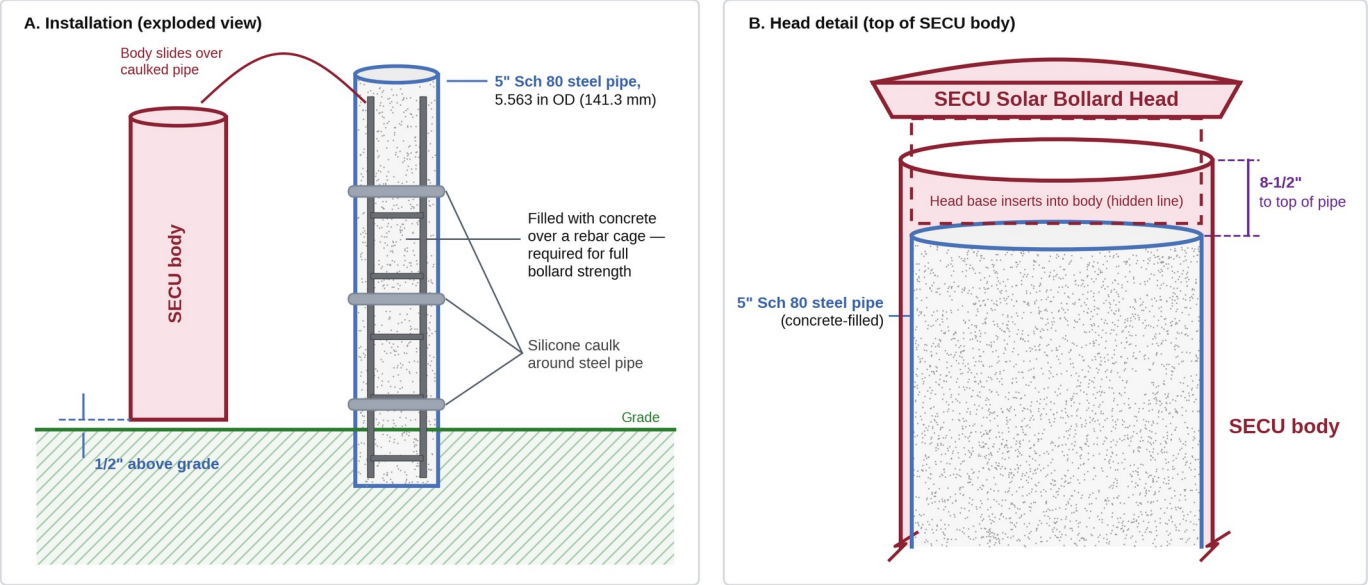
Layer	Component	Function
1. Tensile reinforcement (center)	Structural steel rebar cage	Sits dead-center in the pipe and absorbs tensile stress opposite the point of impact, so the concrete does not shear or snap at the grade-line pivot.
2. Compressive matrix (fill)	Structural concrete or high-strength cement	Encases the rebar and fills the pipe to its inner walls, keeping the steel from ovaling or collapsing inward under impact.
3. Primary structural shield (core)	5" nominal Schedule 80 steel pipe, 5.563 in OD (141.3 mm)	The structural anchor of the assembly: it holds the concrete core and takes the impact force transferred through the outer body.
4. Dampening and tolerance ring (interface)	Heavy beads of flexible silicone caulk around the pipe, above grade	Fill the tolerance gap, dampen vibration, and prevent metal-on-metal rattle and moisture between the pipe and the sleeve.
5. Architectural housing (outer)	SECU body sleeve	Slides down over the caulked pipe. The bottom rests 1/2 in above finished grade to prevent moisture pooling; the top extends 8-1/2 in above the pipe rim to receive the recessed base of the solar head.

Installation sequence

SECU installs in three phases and nine steps: the contractor sets and fills the steel core, then the SECU body and solar head go on once the concrete has fully cured. The light needs no conduit, wiring, or electrician.

SECU Solar Security Bollard Light Mount on 5" Sch 80 Steel Pipe

Not to scale.



Foundation details — embedment depth, pier diameter, footing type, concrete strength, and rebar schedule — to be specified by a licensed structural engineer (PE) for the site, soil conditions, and project security requirements. Pipe, rebar, and concrete are purchased separately.

Phase 1: Foundation and core placement

1. **Excavate and anchor.** Excavate the post hole to the depth and diameter your structural engineer specifies, at minimum the above-grade pipe height. Set the 5" Schedule 80 steel pipe in the hole.
2. **Verify grade clearance.** Confirm the pipe extends to the chosen design height, 36 or 48 in above finished grade. Pour the below-grade concrete foundation, leaving the pipe exposed above grade.
3. **Pour the reinforced core.** Lower the prefabricated rebar cage into the center of the pipe. Fill the pipe to the top rim with structural concrete or cement matrix, strike it flush with the rim, and let it cure fully.

Phase 2: Sleeve preparation and interface

4. **Clean and prep.** Make sure the cured pipe exterior is free of concrete splatter, dust, and grease.
5. **Apply the caulk rings.** Run heavy, concentric beads of structural silicone caulk around the pipe at spaced intervals above grade, as shown in the diagram.
6. **Set the base gap.** Place temporary 1/2 in non-marring spacers or shims flat on the finished grade around the base of the pipe.

Phase 3: Body sleeve and solar head

7. **Mount the SECU body.** Lower the body sleeve straight down over the caulked pipe until its bottom rim rests on the 1/2 in spacers. The caulk compresses into an internal weather seal and a snug fit.
8. **Install the solar head.** Insert the recessed base of the solar head into the top of the body sleeve. It seats in the 8-1/2 in clearance between the top of the pipe and the upper rim of the body.
9. **Lock and clean.** Secure the head to the body with the tamper-resistant hardware provided. Remove the temporary spacers and wipe away excess caulk. The solar sensor takes over from there: dusk-to-dawn light.

Cross-reference foundation profiles, embedment depths, and concrete dimensions with local soil conditions, and have them certified by a licensed structural engineer.

Engineering disclaimer and site verification

Every final installation must be reviewed, adapted, and confirmed by a licensed Professional Structural Engineer (PE) who has analyzed the site before excavation or procurement.

The data, dimensions, foundation ranges, and performance figures in this guide are general guidelines based on standard engineering principles and controlled crash-testing scenarios. Soil composition, local building codes, vehicle threat vectors, and environmental conditions vary significantly from site to site. The PE confirms the foundation type, pier diameter, depth, concrete PSI, and rebar schedule for your specific site and application.

Questions

A lighting specialist will match the right SECU model to your bollard layout and site. Call 800-468-9925 or email Sales@AccessFixtures.com with your bollard count, pipe height, and site plan to get your project quoted and scheduled.