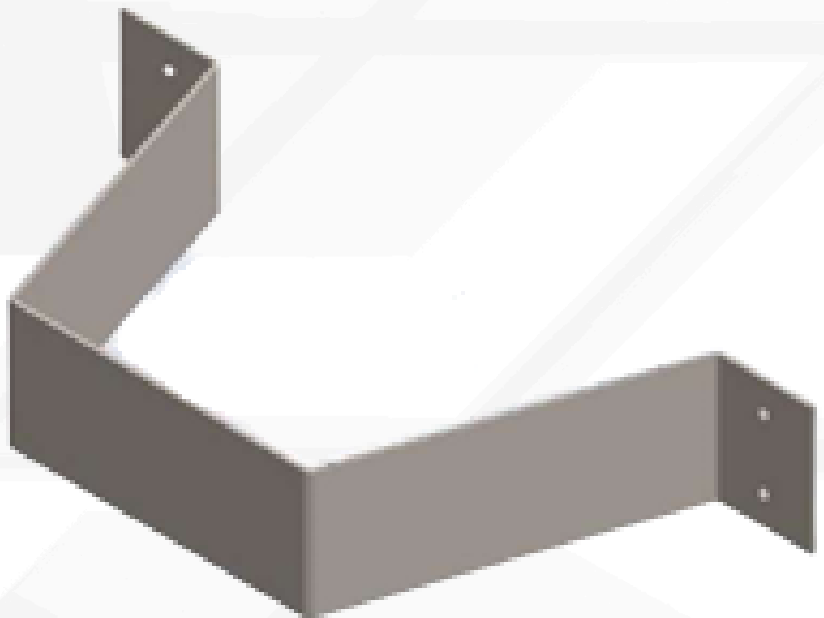


PERFORMANCE SUMMARY

WALL GUARD IMPACT

October 2025 | F194



Purpose of This Document

This document provides guidance on the protection that **F194 Wall Guard provides to EV charging equipment**. The **quality, durability, and real-world performance of the F194 Wall Guard**. Through independent engineering simulations, demonstrates the product's performance under three realistic vehicle impact scenarios that commonly occur in parking and fleet environments.

In **all three impact scenarios**, (Front, Right-side, and Left side) the wall guard maintained protection of the EV charger.

The steel structure design allowed for the impact energy to be absorbed rather than transferring the force to the charger or mounting surface, allowing for **controlled energy absorption**.

Product Overview

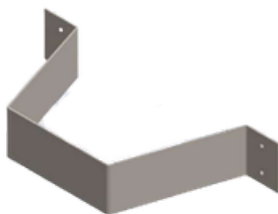
Product: F194 Wall Guard

Application: Protection of wall-mounted EV charging equipment in parking, fleet, and commercial environments

Material: Heavy-duty structural alloy steel

Design Intent: Absorb low-speed vehicle impacts through controlled deformation while maintaining charger protection and structural attachment

The F194 Wall Guard is purpose-built for environments where vehicles and charging infrastructure coexist—and occasional contact is a reality.



Impact Scenarios Evaluated

The F194 Wall Guard was evaluated under three realistic vehicle impact scenarios that commonly occur in parking and fleet environments:

1. **Straight-on vehicle impact** (direct contact)
2. **45° angled impact from the left** (turning or misalignment)
3. **45° angled impact from the right** (mirrored turning condition)

Evaluating multiple impact directions ensures consistent performance regardless of how a vehicle contacts the guard.

Test Conditions (Common Across All Scenarios)

To provide a consistent and conservative evaluation, all simulations used the same vehicle and loading assumptions:

- **Vehicle Weight:** 5,000 lb passenger vehicle
- **Impact Speed:** 5 mph (typical parking-lot speed)
- **Equivalent Static Load Applied:** ~12,700 lb (56,600 N)
- **Analysis Method:** Energy-equivalent static structural simulation
- **Mounting Condition:** Rigid wall-mounted attachment

These conditions represent a conservative, industry-accepted approach for evaluating low-speed vehicle impacts on protective infrastructure.

Key Performance Results

Proven Charger Protection

- In **all three impact scenarios**, the wall guard maintained protection of the EV charger
- Controlled Energy Absorption
- The steel structure deforms intentionally to absorb impact energy rather than transferring force to the charger or mounting surface

Maximum Observed Deflection

- **Straight-on impact:** approximately **1 inch**
- **Angled impacts (left & right):** up to approximately **4 inches**
- Deformation remains within the guard's design envelope and **does not allow vehicle contact with the charger**

Structural Integrity Maintained

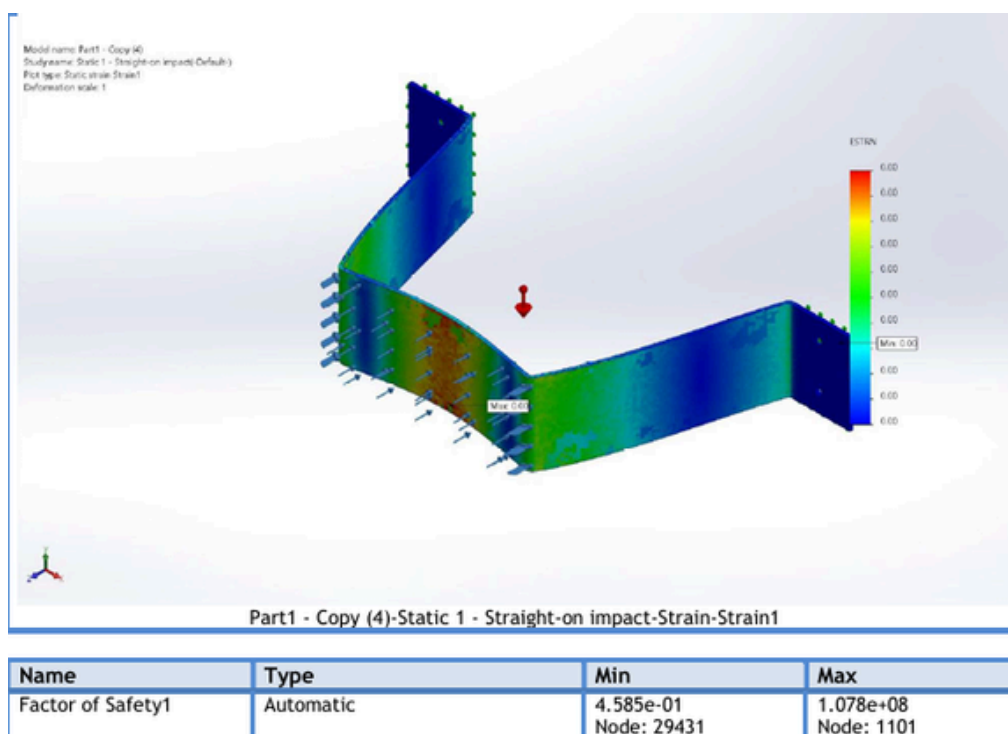
- No fracture, tearing, or separation observed
- Wall guard remains securely anchored after impact

Straight-On Impact

Straight-on impact simulation – F194 Wall Guard

Annotated highlights:

- **Impact condition:** 5,000 lb vehicle at 5 mph (straight-on contact) –
- **Load applied:** ~12,700 lb equivalent static force –
- **Maximum deflection:** ~1 inch –
- **Result:** Charger remains fully protected



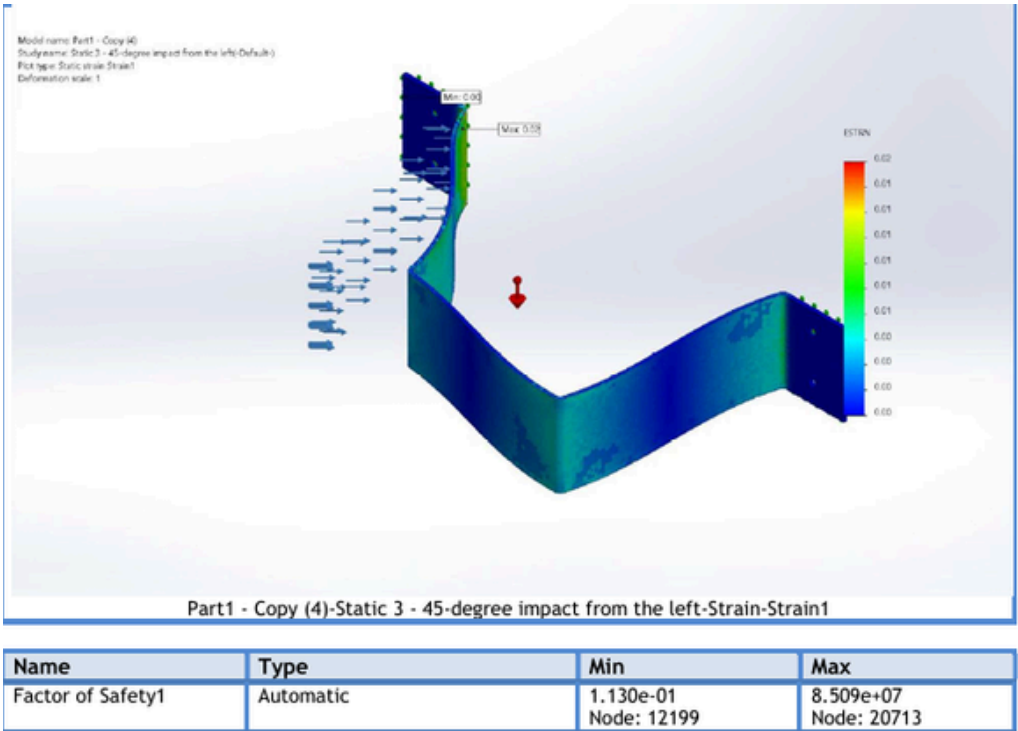
Conclusion: - Energy absorbed through controlled bending of the guard of less than/slightly up to 4 inches and still protects the charger
- Charger clearance maintained throughout the event.

45° Angled Impact – Left Side

45-degree left impact simulation – F194 Wall Guard

Annotated highlights: -

- **Impact condition:** 5,000 lb vehicle at 5 mph (45° approach from left) –
- **Load applied:** ~12,700 lb equivalent static force –
- **Maximum deflection:** up to ~4 inches –
- **Result:** Controlled bending absorbs energy while maintaining charger clearance



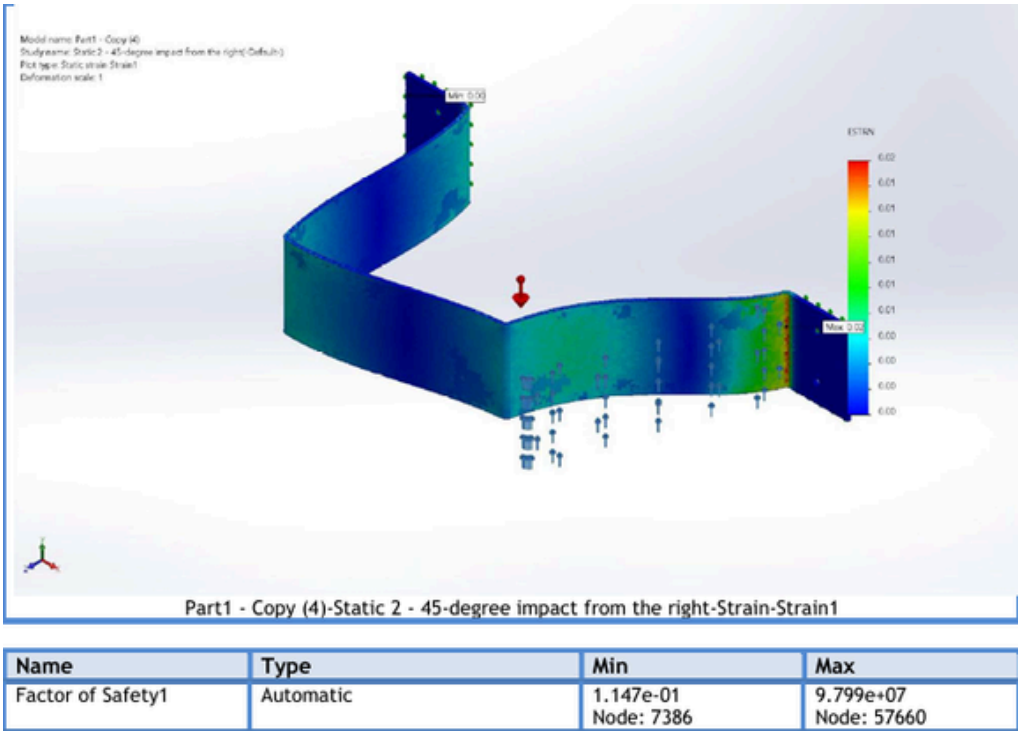
Conclusion: - Energy absorbed through controlled bending of the guard of less than/slightly up to 4 inches and still protects the charger
- Charger clearance maintained throughout the event.

45° Angled Impact – Right Side

45-degree right impact simulation – F194 Wall Guard

Annotated highlights:

- **Impact condition:** 5,000 lb vehicle at 5 mph (45° approach from right) –
- **Load applied:** ~12,700 lb equivalent static force –
- **Maximum deflection:** up to ~4 inches –
- **Result:** Performance mirrors left-side impact with full charger protection



Conclusion: - Energy absorbed through controlled bending of the guard of less than/slightly up to 4 inches and still protects the charger
- Charger clearance maintained throughout the event.

Why This Matters for Customers

From an engineering and asset-protection standpoint, the F194 Wall Guard is designed to address a specific failure mode common to EV charging installations: **low-speed vehicle impact in constrained parking environments**. The product is optimized to absorb energy, limit force transfer, and preserve charger operability.

Key technical benefits include:

- **Energy absorption through controlled plastic deformation** rather than rigid force transfer –
- **Load distribution across a continuous steel structure**, reducing stress concentrations –
- **Predictable deformation behavior** validated under multiple impact orientations –
- **Preservation of charger clearance** under worst-case simulated deflections

Design Philosophy: Energy Management Over Vehicle Stopping

The F194 Wall Guard is intentionally **not designed to rigidly stop a vehicle**. Instead, it is engineered to manage impact energy in a controlled, predictable manner. By allowing controlled plastic deformation, the guard limits peak forces transmitted to the charger and wall structure while preserving equipment alignment and function.

This approach aligns with best practices in impact engineering, where **controlled deformation is preferred over rigid resistance** when protecting sensitive assets.

Key Questions and Answers

Does the product manage realistic impact loads?

Yes. The simulations represent conservative, low-speed vehicle impacts consistent with parking environments, using accepted energy-equivalent force methods.

Is deformation acceptable or a failure?

Deformation is intentional and desirable. Controlled plastic deformation is the mechanism by which impact energy is absorbed and peak loads are reduced.

Why not use bollards instead?

Bollards protect space, not equipment. Their rigidity transfers high loads into slabs and anchors, often causing hidden damage. The wall guard prioritizes charger protection and predictable behavior.

What happens after an impact?

Damage is visible, inspectable, and localized to a sacrificial component. Chargers remain protected and typically operational.

Is this approach defensible in procurement or risk review?

Yes. The product demonstrates a clear engineering rationale, validated performance across multiple impact orientations, and a defined inspection and replacement strategy.

Summary Statement

The F194 Wall Guard represents a technically sound, purpose-engineered solution for protecting EV charging equipment from low-speed vehicle impacts. By prioritizing energy management, controlled deformation, and charger preservation, it provides advantages over rigid bollards or unprotected installations that are both measurable and defensible.

Conclusion: This is not just protection—it is engineered risk mitigation.

Additional Information

- Full engineering simulation reports are available upon request
- Installation guidelines and mounting requirements are provided separately
- Product dimensions, finishes, and ordering details are available on the product page

Comparison to Alternative Protection Strategies

One-Page Technical Comparison

Attribute	F194 Wall Guard	Traditional Bollards	No Protection
Primary function	Energy absorption & charger protection	Vehicle obstruction	None
Structural behavior	Ductile, controlled deformation	Rigid, high stiffness	Charger absorbs impact
Energy management	Absorbs and dissipates impact	Transfers energy to anchors/slab	Transfers energy to charger
Peak force transfer	Reduced via deformation	High, localized	High, uncontrolled
Load distribution	Distributed across wall-mounted	Concentrated at bollard base	Concentrated at charger mounts
Post-impact visibility	Deformation clearly visible	Damage often hidden at slab/anchors	Damage often internal
Replaceable after impact	Yes (sacrificial component)	Often requires concrete repair	Charger replacement likely
Designed specifically for EV chargers	Yes	No	No

F194 Wall Guard vs. No Physical Protection

Installations without physical protection rely solely on the charger enclosure and mounting hardware to resist impact loads. Engineering simulations and field experience show that:

- Charger housings are not designed to absorb vehicle kinetic energy
- Impact loads are transmitted directly into the charger frame and wall structure
- Even low-speed impacts can result in enclosure damage, internal component misalignment, or mounting failure

The F194 Wall Guard provides a **first line of defense**, ensuring that:

- Vehicle impact forces are intercepted before reaching the charger
- Structural deformation occurs in a sacrificial, replaceable component
- Charger alignment, internal components, and electrical integrity are preserved

Inspection and Replacement Guidance

Post-Impact Inspection

Following any known or suspected vehicle contact, the F194 Wall Guard should be visually inspected for: - Permanent bending or visible deformation - Cracked welds or coating damage - Changes in clearance between the guard and charger - Loosening of wall-mounted fasteners

Because the wall guard deforms visibly under load, inspection does not require specialized tools or disassembly.

Replacement Criteria

Replacement of the F194 Wall Guard is recommended if: -

- Permanent deformation approaches or exceeds the original design envelope –
- Charger clearance is reduced below installation requirements –
- Weld integrity or mounting hardware is compromised

In most cases, replacement can be performed without disturbing the charger or electrical connections, minimizing downtime.

Disclaimer

Simulation results are based on conservative engineering assumptions intended to represent low-speed vehicle impacts. Actual field performance may vary based on installation conditions, mounting structure, vehicle type, and impact dynamics.

Legal Manufacturer

EV Charge Solutions®
500 Canal View Boulevard, Suite 100
Rochester, NY 14623
(585) 533-4051
evchargesolution.com

This document provides guidance on the protection that F194 Wall Guard provides to EV charging equipment. The quality, durability, and real-world performance of the F194 Wall Guard. Through independent engineering simulations, demonstrates the product's performance under three realistic vehicle impact scenarios that commonly occur in parking and fleet environments.

