

ANSI/ISEA Z89.1-2026

Shock, Impact, and Penetration Testing



Industrial safety helmets are tested against updated ANSI/ISEA Z89.1-2026 requirements to help ensure protection from impact, penetration, and electrical hazards.

The 2026 version of the standard keeps core performance requirements intact while adding new **optional protection levels** that address evolving workplace risks.

PROTECTION OVERVIEW

Top of head protection

Type I helmets are designed to reduce the force of impact from blows to the top (crown) of the head.

Required testing includes:

- Apex impact force transmission
- Apex penetration resistance
- Flammability

Type I+:

- Adds off-center (front, rear, and side) force transmission testing, chin strap retention, and retention system effectiveness.

TYPE I

Vertical impact & penetration protection



Chin strap not required



Optional retention features

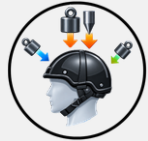


TEST PARAMETERS

Apex Impact Energy	~54.5 J
Apex Penetration Energy	~24.5 J
Flammability & Conditioning	Passes

TYPE I+

Top impact + off-center force transmission



Chin strap required

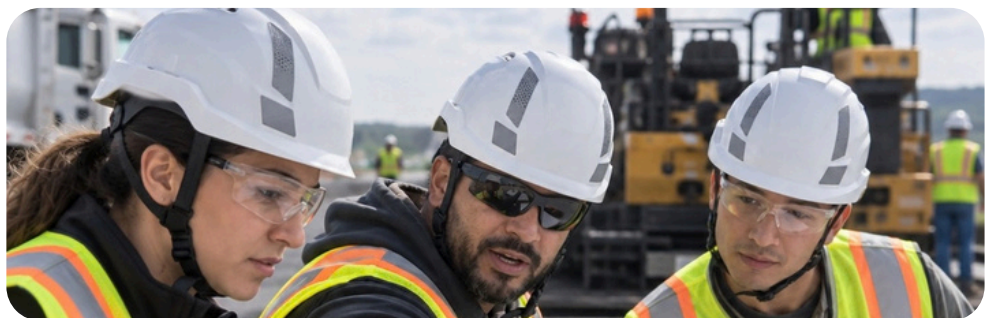


Retention system effectiveness



ADDITIONAL TEST PARAMETERS

Off-Center Force Transmission	≤ 10.0kN
Chin Strap Retention	Required
Retention System	Required



PROTECTION OVERVIEW

Top and side impact protection

Type II helmets are designed to reduce the force of impact from blows to the top and sides of the head.

Required testing includes:

- Apex impact force transmission
- Apex penetration resistance
- Side, front, and rear impact energy attenuation
- Off-center penetration
- Chin strap retention (if equipped)
- Flammability

Type II+:

- Adds a required chin strap, chin strap retention testing, and retention system effectiveness testing.



TYPE II

Multi-directional impact/penetration protection



Chin strap not required



Optional retention features

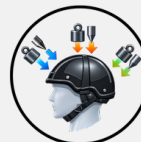


TEST PARAMETERS

Apex Impact Energy	~54.5 J
Apex Penetration Energy	~24.5 J
Impact Energy Attenuation	≤ 150g
Off-Center Penetration	Passes

TYPE II+

Multi-directional impact/penetration protection



Chin strap required



Retention system effectiveness



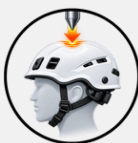
ADDITIONAL TEST PARAMETERS

Chin Strap Retention	Required
Retention System	Required

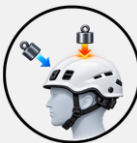


EN 12492:2012

Top penetration protection



Multi-directional impact protection



Required chin strap



Retention system



No electrical protection rating



Environmental conditioning



MOUNTAINEERING

Mountaineering head protection

Helmets meeting EN 12492, the European standard for mountaineering helmets, are designed to protect against impacts during climbing and alpine activities. This standard requires a chin strap to help keep the helmet securely in place.

The chin strap must be at least 0.5 inches wide, cannot elongate more than 1 inch, and must pass retention testing.

Required testing includes:

- Shock absorption (impact protection)
- Penetration resistance

What's New in the Updated Standard

The ANSI/ISEA Z89.1-2026 revision introduces an **optional additional protection designation** while keeping baseline requirements consistent:

New “+” Additional Protection Designation

- Required chin strap
- Chin strap retention
- Retention system effectiveness (roll-off)
- Additional off-center force transmission testing for Type I+

Other Optional Performance Markings

- Reverse donning
- Enhanced Visibility (EV)
- Higher Temperature (HT)
- Lower Temperature (LT)

These updates allow manufacturers and employers to better match helmet performance to specific jobsite risks.

Electrical Classes (All Types)

Class G (General)

Tested to 2,200 volts

Class E (Electrical)

Tested to 20,000 volts, with additional burn-through testing at 30,000 volts

Class C (Conductive)

No electrical protection

