

# SHOCK, IMPACT, & PENETRATION TESTING



Industrial head protection is subjected to many types of testing to provide the best protection possible. Learn about shock and impact testing requirements for ANSI/ISEA and EN standards.



**ANSI/ISEA Z89.1-2014 (R2019)  
TYPE I**



**ANSI/ISEA Z89.1-2014 (R2019)  
TYPE II**



**EN 12492:2012**

# ANSI/ISEA Z89.1-2014 (R2019)

## Type I



Shock & Impact



Penetration



Test Zone

## SHOCK & IMPACT



### Test:

Force Transmission

### Equivalent:

Hammer falling from over 21 ft. (6.4 m)

### Impact Force:

54.5 Joules (40.2 ft.-lb.)

### Pass Criteria:

Transmitted force: < 4450 N (1000 lb.)

Sample average: < 3780 N (850 lb.)

## PENETRATION

### Test:

Apex Penetration

### Equivalent:

Hammer falling from over 10 ft. (3.0 m)

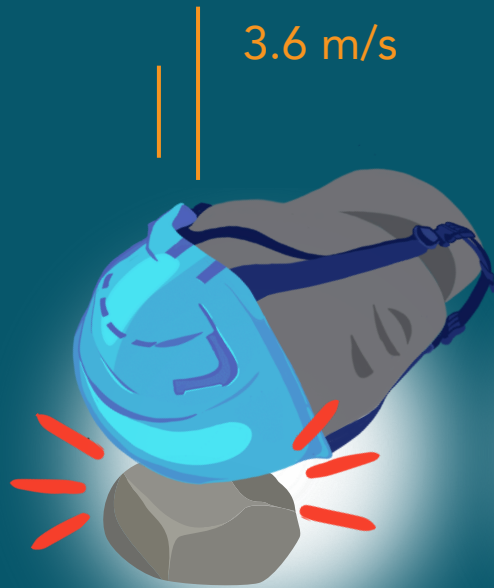
### Impact Force:

24.5 Joules (18.1 ft.-lb.)

### Pass Criteria:

Penetrator shall not make contact with top of test headform.

ANSI/ISEA Z89.1-2014 (R2019)  
Type II



Shock & Impact



Penetration



Test Zone

SHOCK & IMPACT



**Test:**

Impact Energy Attenuation

**Equivalent:**

Hammer falling from  
nearly 12 ft. (3.7m)

**Impact Force:**

30.6 Joules (22.6 ft.-lb.)

**Pass Criteria:**

Maximum acceleration  $\leq 150 \text{ g}^*$

PENETRATION

**Test:**

Off-Center Penetration

**Equivalent:**

Hammer falling from  
over 4.9 ft. (1.5 m)

**Impact Force:**

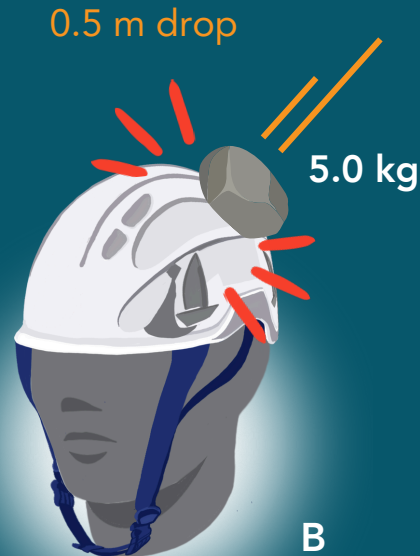
12.5 Joules (9.2 ft.-lb.)

**Pass Criteria:**

Penetrator shall not make contact with  
top of test headform.

EN 12492:2012

## MOUNTAINEERING



### Shock & Impact



## SHOCK & IMPACT

**Test:**  
Shock Absorption

### Impact Force:

A: 98.1 Joules (72.35 ft.-lb.)  
B: 24.0 Joules (17.70 ft.-lb.)

### Pass Criteria:

Transmitted force  $\leq$  10000 N (2250 lb.)

## PENETRATION

**Test:**  
Penetration

### Impact Force:

29.4 Joules (21.7 ft.-lb.)

### Pass Criteria:

Point of striker does not contact headform