Burglary Resistant Glasses

Rishabh Patel
Technical manager at AIS

Enhanced Security: prevents forced entry by resisting break-ins using tools
Delay = Protection: Even if broken, the glass holds together, delaying intrusion and giving time for response or deterrence.

Need for Burglary Resistant Glass

Safety of People & Assets: Protects occupants, valuables, and sensitive areas (homes, offices, retail stores, banks).
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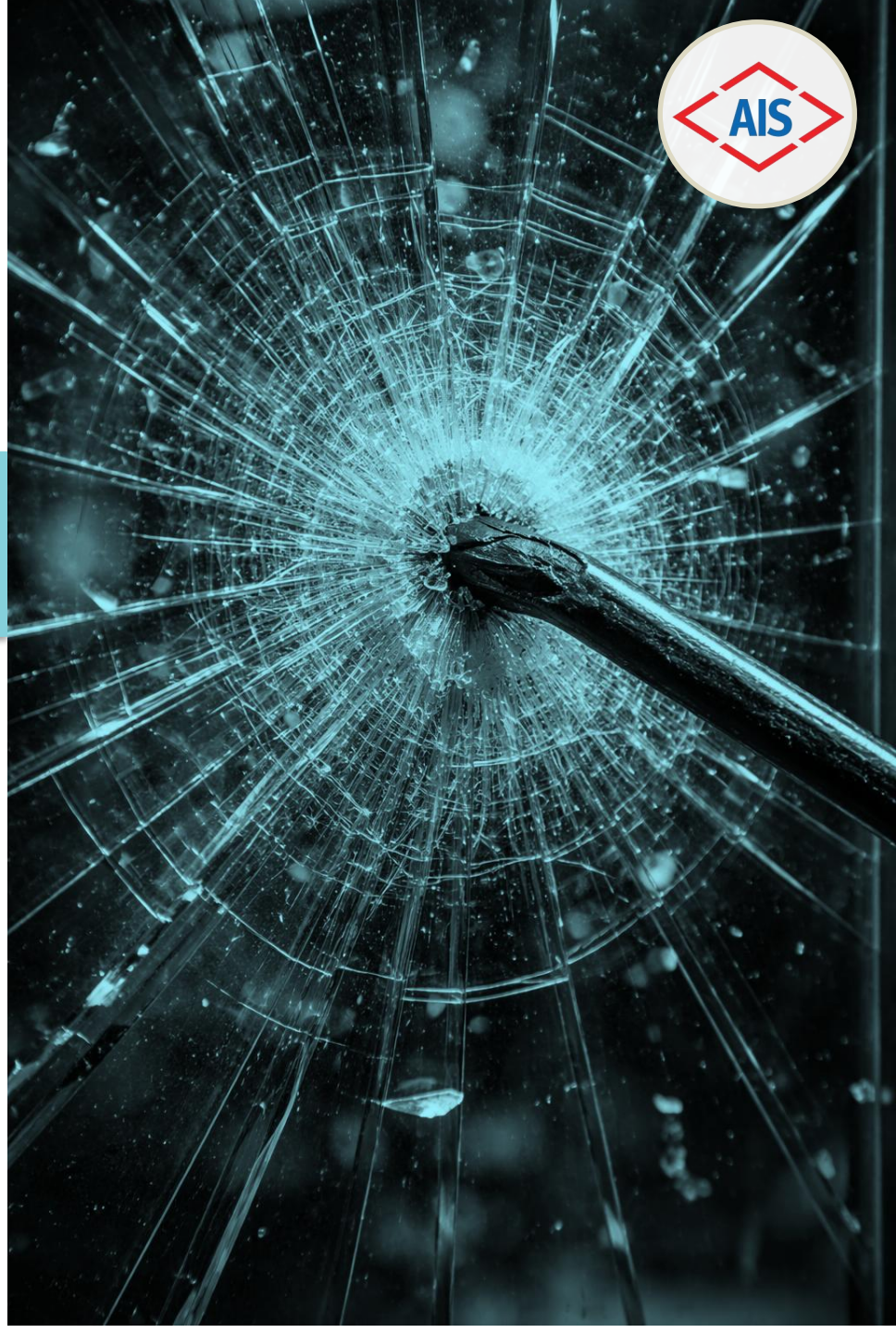
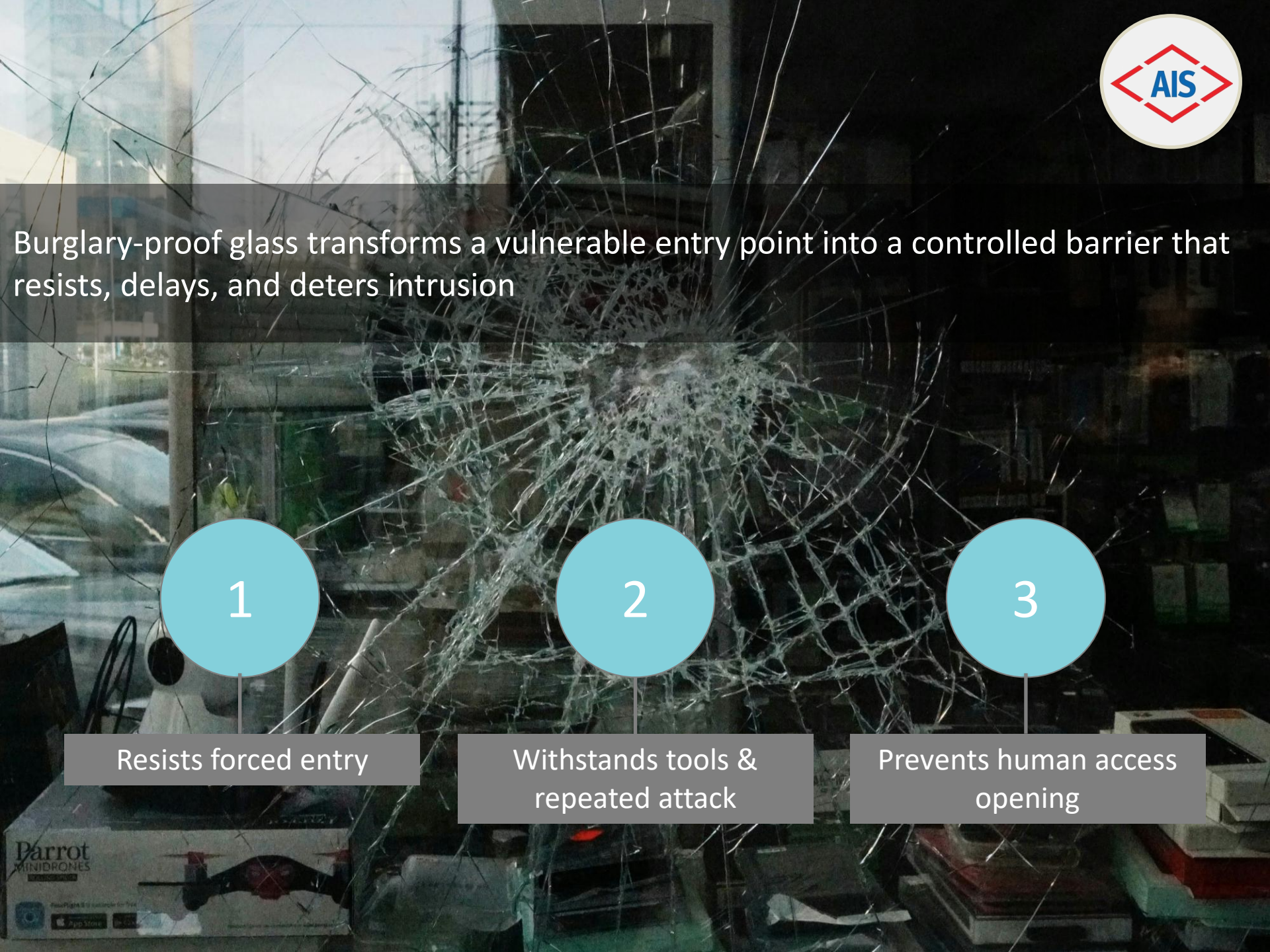
Compliance & High-Security Needs: Required in critical applications like jewellery stores, ATMs, embassies, and high-end residences.





Burglary-proof glass transforms a vulnerable entry point into a controlled barrier that resists, delays, and deters intrusion

1

Resists forced entry

2

Withstands tools & repeated attack

3

Prevents human access opening

Types of Threats

- Manual Forced Entry (Primary Threat)
- Repeated Impact / Blunt Force
- Sharp Tool Attacks
- Smash-and-Grab Attempts
- Vandalism / Opportunistic Damage
- Co-ordinated Break-in Attempts

Key Terminology

- Burglary-Resistant Glass: Glass designed to resist and delay forced entry
- Laminated Glass: Multiple glass layers bonded with interlayers (PVB/SGP) for strength and integrity
- Interlayer: Plastic layer that holds glass fragments together after breakage
- Delamination: Separation of glass and interlayer under extreme stress
- PVB (Polyvinyl Butyral): Common interlayer material
- SGP (Ionoplast Interlayer): Higher strength interlayer vs PVB
- Glass Ply: Individual layer in laminated glass
- Thickness Build-up: Total thickness of glass assembly
- Impact Resistance: Ability to withstand sudden force (e.g., stone/ball impact)
- Manual Attack Resistance: Ability to resist tools like axe, hammer, crowbar
- Penetration Resistance: Ability to prevent formation of an opening
- Blow Count: Number of strikes required to breach the glass
- Delay Time: Time the glass can resist intrusion (critical for security systems)
- Smash-and-Grab Resistance: Ability to prevent quick break-ins
- Attack Side: Side from which glass is tested (important in design)
- Framing System: Frame that must match glass strength (weak frame = system failure)

EN 356 Standard

What is EN 356?
EN 356 is a European standard that defines the resistance of glass against manual attack (burglary, vandalism, forced entry). It classifies glass based on impact resistance, tools used, and number of strikes required to break through.

A-Class (P1A – P5A) → Impact / Throw Resistance
Tested using a **4.11 kg steel ball drop test**
Protects against:

- Stones
- Accidental impacts

Does NOT provide real burglary resistance
Use case: Residential glazing, basic safety

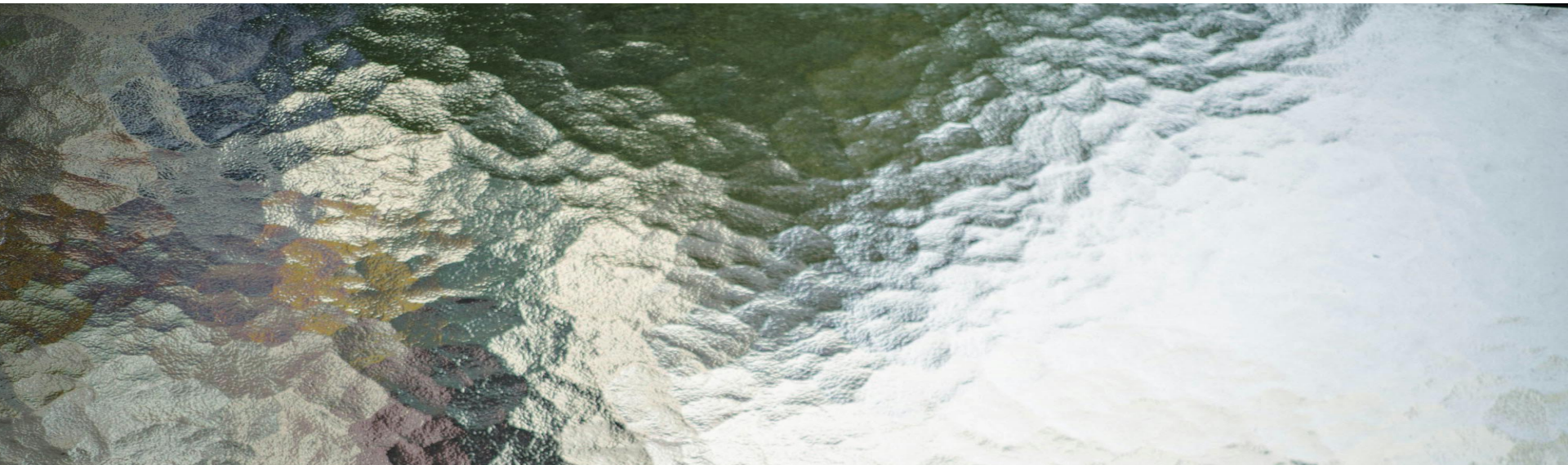
B-Class (P6B – P8B) → Burglary Resistant Glass
Tested using **axe / hammer attacks (manual forced entry simulation)**
Measures:

- Number of blows required to create an opening

Provides actual burglary protection
Use case: Banks, jewelry stores, high-security façades

EN 356 Test Methods

Class	Test Method	Resistance Level
P1A–P5A	Steel ball drop	Low (impact resistant only)
P6B	~30–50 axe blows	Medium security
P7B	~50–70 axe blows	High security
P8B	70+ axe blows	Very high security



IS 16978 Standard

IS 16978 is an Indian Standard that specifies **test methods and classification for security glazing against manual attack**. IS 16978 defines the performance and classification of security glazing in India based on its ability to resist and delay forced entry.
It is largely **aligned with EN 356**, adapted for Indian conditions and applications.

1. Manual Attack Simulation
Use of tools (axe/hammer-like)
Measures resistance to forced entry

2. Time / Effort-Based Resistance
Not just impact → but how long glass resists intrusion

3. Opening Formation
Whether an intruder can create a passable opening

4. System Performance
Emphasis on glass + interlayer behavior
Implicit importance of installation & framing

EN vs IS Comparison

Parameter	EN 356	IS 16978
Origin	European Standard	Indian Standard
Applicability	Global benchmark for security glazing	Indian projects & regulatory compliance
Classification System	P1A–P5A (impact), P6B–P8B (manual attack)	Performance-based classification
Impact Testing	Steel ball drop test included	Not a primary classification method
Manual Attack Test	Axe attack test (defined blow count)	Tool-based attack simulation (focus on resistance)
Focus Area	Impact + burglary resistance	Primarily burglary / forced entry resistance
Performance Criteria	Based on drop height & number of blows	Based on resistance time & opening formation
Output Metric	Clearly defined classes (P1A–P8B)	Performance levels (no standardized P labels)
Design Approach	Classification-driven specification	Scenario / risk-based specification
Use Case	Specification clarity & international projects	Local compliance & practical security needs

Design Considerations

It is generally recommended to use such glass as part of a complete system (security glass + high-security framing) for maximum effectiveness.

Use of glass based on threat

Thank you