

STRUCTURAL GLASS | LAMINATE SUBSTRATE | EN 1863 | ASTM C1048 HS | IS 2553

Heat Strengthened Glass

Twice the Strength. The Smarter Lamine Substrate.

IPH Glasses processes heat strengthened glass across a full range of substrates and coatings — the preferred specification for laminated overhead glazing, large-format facades, and thermally demanding applications where reduced NiS risk and superior post-breakage laminate integrity are essential.

PRODUCT CATEGORY

Structural Glass
Lamine Substrate
EN 1863
ASTM C1048 HS
IS 2553

AUTHORIZED DISTRIBUTOR

Guardian Glass | Saint-Gobain
Kuraray | Technoform | Fenzi

PRODUCT OVERVIEW

Heat Strengthened Glass

Twice the strength of annealed glass. The preferred laminate substrate.

Heat Strengthened Glass (HSG) is produced by heating annealed glass to approximately 620°C — identical to fully tempered glass — but cooling it at a **slower, controlled rate**. This introduces a lower surface compressive stress (30–52 MPa), producing approximately **twice the strength of standard annealed glass** with a critically different and more useful breakage pattern for laminated applications: larger, irregular fragments that are held more effectively by the interlayer after breakage.

2× Stronger than annealed glass	30–52 MPa Surface compressive stress range	4–19 mm Thickness range	2850 × 6000 mm Maximum panel size
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PRODUCT CLASSIFICATION

Critical Specification Distinction

Heat strengthened glass occupies a precise and deliberate position in the architectural glass performance hierarchy — between annealed glass and fully tempered glass:

Property	Annealed	Heat Strengthened	Fully Tempered
Surface Stress	< 10 MPa	30–52 MPa	69–110 MPa
Relative Strength	Baseline (1×)	Approx. 2×	Approx. 4–5×
Breakage Pattern	Large sharp shards	Large irregular fragments — best for laminates	Small blunt fragments
Post-Breakage	Barrier lost	Fragments retained in interlayer	Granules fall — partial barrier loss
Safety Glass?	No	Yes — when laminated only	Yes — standalone
NiS Breakage Risk	Very low	Significantly lower than FT	Present — high internal stress
Standards	IS 14900 EN 572	EN 1863 ASTM C1048 HS AS/NZS 2208 (laminate)	EN 12150 ASTM C1048 FT IS 2553 AS/NZS 2208

Key Specification Insight: Heat strengthened glass is NOT a standalone safety glass. It achieves safety glass status only when laminated. Its larger breakage fragments are a performance advantage — gripping the interlayer more effectively for post-breakage load retention. This is why EN 1863 HS glass is the mandatory substrate for overhead laminated glazing in most international standards.

TECHNICAL INSIGHT

Nickel Sulphide (NiS) Advantage

NiS inclusions are microscopic particles that expand over time, eventually causing fully tempered glass to break spontaneously — sometimes years after installation. Heat strengthened glass, with lower residual stress, sits below the NiS critical threshold — significantly reducing this risk without requiring the additional heat soak testing process (EN 14179).

Risk Factor	Fully Tempered	Heat Strengthened
NiS Spontaneous Breakage	Present — high stress amplifies NiS expansion	Significantly reduced — below NiS critical threshold
Heat Soak Testing	Required for high-risk applications (EN 14179)	Generally not required — lower inherent risk
Large Panel Facade Risk	Higher — particularly panels > 2.5 m² at height	Lower — preferred for large monolithic facade panels
Laminated Mitigation	Lamination partially mitigates NiS risk	Lower base risk + lamination = comprehensive mitigation

TECHNICAL DATA

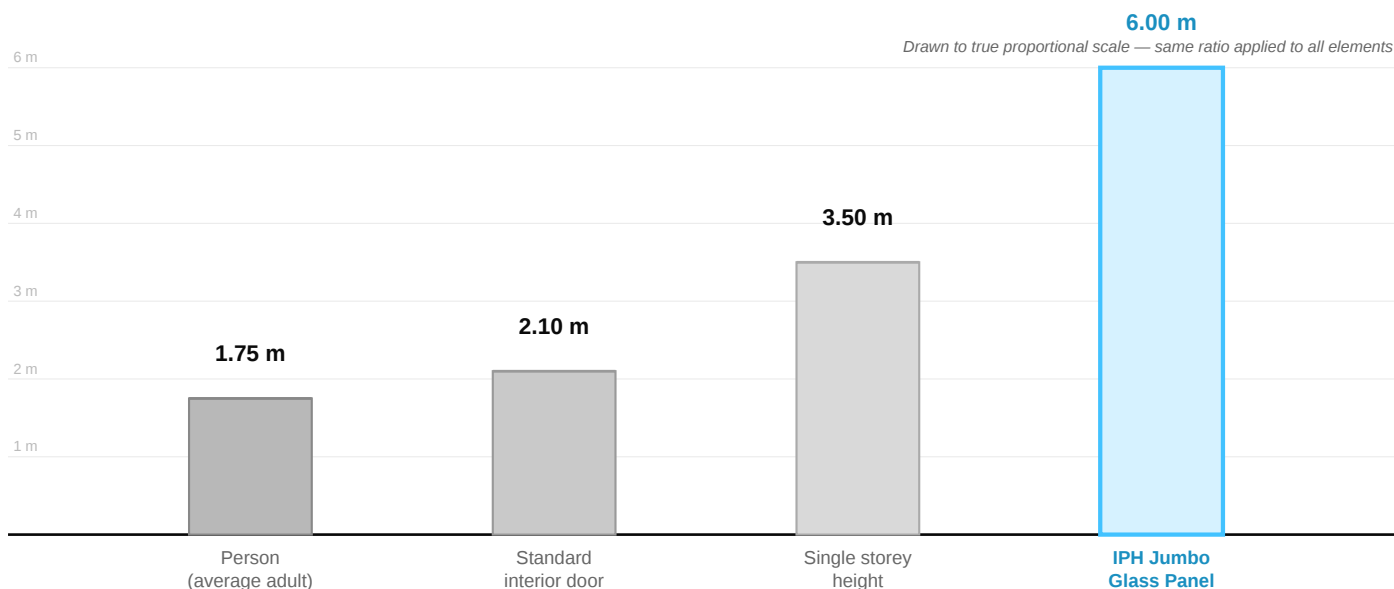
Technical Specifications

Parameter	Specification
Process Type	Horizontal Roller — Forced Convection Furnace (controlled cooling rate)
Glass Substrate Types	Clear, Extra Clear, Ultra Clear, Tinted, Solar-Control Coated, Low-E Coated (Single / Double / Triple Silver)
Surface Treatments	Ceramic Frit, Digital Printing, Sandblasting, Acid Etching
Upgrade Path	Laminated Glass Insulated Glass Unit Curved Laminated Glass
Thickness Range	4 mm / 5 mm / 6 mm / 8 mm / 10 mm / 12 mm / 15 mm / 19 mm
Maximum Dimensions	2,850 mm × 6,000 mm (subject to thickness)
Edge Finishes	Rough Grind Arrissed Super Polished
Surface Compressive Stress	30 MPa – 52 MPa (4,300 – 7,500 psi)
Relative Strength	Approximately 2× the flexural strength of annealed glass
Thermal Differential	Approximately 100°C — suitable for frit-bordered and shaded applications
Breakage Fragments	Large irregular fragments — preferred substrate for laminated glass
NiS Breakage Risk	Significantly lower than fully tempered glass
Safety Classification	Safety glass status achieved only when laminated — per EN / IS / AS NZS

MAXIMUM DIMENSIONS

Jumbo Glass Capability & Scale

IPH Glasses processes panels up to **2,850 mm × 6,000 mm** — enabling large, uninterrupted glass surfaces that reduce joint lines and elevate the visual quality of architectural facades, atriums, and interior spaces. The scale diagram below is drawn to true proportion: every bar uses the same fixed scale factor.



Maximum panel width: 2,850 mm — shown separately from height, as glass panels are supplied to project-specific width and height combinations up to these maximum dimensions.

Reference Object	Typical Dimensions	How IPH Glass Compares
Standard interior door	900 × 2,100 mm	IPH panel height is 2.9× a standard door height
Typical floor-to-floor height	3,000 – 3,600 mm	A single IPH panel can span the full floor-to-ceiling height in one piece
Average adult height	~1,750 mm	IPH panel height is 3.4× the height of an average adult
ISO shipping container height	2,591 mm	IPH panel height is 2.3× the height of a standard shipping container
Maximum panel width (separate dimension)	2,850 mm	Width and height are supplied independently up to these maximums, in project-specific combinations

■ At 2,850 × 6,000 mm, heat strengthened glass panels cover full double-storey facade heights — enabling large monolithic glass surfaces with minimal joint lines.

■ The wider thickness range (4–19 mm vs 4–12 mm for fully tempered) makes heat strengthened glass suitable for heavier structural overhead applications.

■ Large panels above 2.5 m² benefit significantly from heat strengthened glass — the lower NiS spontaneous breakage risk reduces the probability of post-installation glass failure on high-rise facades.

STANDARDS & COMPLIANCE

Applicable Standards

IPH Glasses processes and supplies this product in compliance with the following Indian (IS/BIS), European (EN/ISO), American (ASTM/UL/NIJ), and Australian/New Zealand (AS/NZS) standards:

Standard Code	Title & Scope
Indian Standards — Bureau of Indian Standards (BIS)	
IS 2553 Part 1 : 1990	Safety glass — General requirements (as laminate component) (India)
IS 14900 : 2000	Transparent float glass — Specification (India)
European Standards — CEN	

EN 1863-1 : 2011	Glass in building — Heat strengthened soda lime silicate glass — Part 1: Definition and description
EN 1863-2 : 2004	Glass in building — Heat strengthened soda lime silicate glass — Part 2: Evaluation of conformity
EN 572-1 : 2012	Glass in building — Basic soda lime silicate glass products — Definitions and general physical properties
EN 572-2 : 2012	Glass in building — Float glass
EN 14179-1 : 2005	Glass in building — Heat soaked thermally toughened glass (reference: heat soak not required for HS)
European Standards — CEN / ISO	
EN ISO 12543-1 : 2011	Glass in building — Laminated glass and laminated safety glass — Definitions (as laminate substrate)
ASTM International — USA	
ASTM C1048 : 2018	Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass — Kind HS (Heat Strengthened)
ASTM C1036 : 2016	Standard Specification for Flat Glass
ASTM E1300 : 2016	Standard Practice for Determining Load Resistance of Glass in Buildings
ASTM C1172 : 2014	Standard Specification for Laminated Architectural Flat Glass (as laminate substrate)
Australian / New Zealand Standards — Standards Australia / SNZ	
AS/NZS 2208 : 1996	Safety glazing materials in buildings (as laminate component)
AS 1288 : 2006	Glass in buildings — Selection and installation
AS/NZS 4667 : 2000	Quality requirements for cut-to-size and processed glass

ARCHITECTURAL APPLICATIONS

Applications

Laminated Overhead Glazing The primary specification for skylights, glass roofs, and canopies — post-breakage fragment retention is the critical safety requirement.	Large-Format Facade Panels High-rise curtain walls and large spandrel panels where reduced NiS spontaneous breakage risk is a specification priority.	Structural Laminated Balustrades Balustrades without a top rail — post-breakage structural integrity and load retention required.
Spandrel & Cladding Panels Facade spandrels where ceramic frit or coating-induced thermal gradients exceed annealed glass thermal resistance.	Solar Control Facade Systems High-performance coated facades where solar-control coatings create high internal thermal stress.	Glass Canopies & Entrance Cantilevered glass structures requiring laminated safety glass with post-breakage load-carrying capacity.
Cold Rooms & Industrial Industrial and food storage glazing where large thermal differentials demand enhanced thermal stress resistance.	Curved Laminated Glass The standard substrate for curved laminated glass — formability, strength, and fragment size ideal for curved overhead configurations.	Insulated Glass Spandrels Outer pane of IGUs in spandrel applications where opaque backing and solar loading demand beyond annealed glass performance.

COMPARISON

Product Comparison

Performance Attribute	Standard Float Glass	Heat Strengthened Glass
Strength vs Annealed	✗ Baseline — lowest strength	✓ Approx. 2× — intermediate between annealed and FT
Thermal Differential Resistance	✗ ~40°C — thermal breakage risk in shaded facades	✓ ~100°C — safe for frit borders, partial shade, solar coatings
NiS Spontaneous Breakage	✗ N/A at low stress	✓ Significantly lower than fully tempered — no heat soak generally needed
Laminate Post-Breakage	✗ Adequate fragment retention	✓ Superior — preferred substrate for overhead laminates per EN 1863
Safety Glass Standalone	✗ Not a safety glass	✓ Only as laminated glass — important specification distinction
Large Panel Facades (>2.5 m²)	✗ Not recommended — NiS risk present	✓ Preferred — lower spontaneous breakage risk for high-rise facades
Standards Compliance	✗ IS 14900 EN 572 (float glass only)	✓ EN 1863 ASTM C1048 HS IS 2553 (laminate) AS/NZS 2208

MANUFACTURING EXCELLENCE

Quality Assurance

Every panel processed at IPH Glasses passes through a structured, multi-stage quality control process — from incoming raw material to final pre-dispatch inspection.

Raw Material Verification

Incoming float glass and component materials (interlayers, spacers, sealants) are checked against supplier specification before entering production.

Process-Controlled Manufacturing

Furnace temperature, cooling rate, lamination pressure, and IGU assembly parameters are monitored and logged at each processing stage.

Optical Quality Inspection

Glass surfaces are visually inspected for distortion, bow, roller wave, and coating defects prior to dispatch.

Dimensional Accuracy Checks

Panel dimensions, squareness, and thickness are verified against project specification tolerances.

Edge Quality Inspection

Edge finish (rough grind, arrissed, or super polished) is checked for consistency and conformance to the specified finish.

Toughening Process Validation

Surface compressive stress and fragmentation pattern are verified on sample panels from each production batch to confirm heat treatment compliance.

Batch Traceability

Production records link each panel batch to its raw material source, processing parameters, and quality check results.

Final Pre-Dispatch Sign-Off

A final inspection is carried out before packing and dispatch, confirming the panel meets project specification and IPH Glasses' internal quality criteria.

OUR CAPABILITY

Why Choose IPH Glasses?

IPH Glasses — operating as Mahavir Glass Enterprise — is one of Gujarat's most trusted architectural glass processors and authorized distributors for Guardian Glass and Saint-Gobain. We serve architects, developers, facade consultants, and PMC teams from our facility in Kheda, Gujarat.

Authorized Distributor

Guardian Glass and Saint-Gobain — certified supply chain, authentic products with full traceability.

Advanced Processing

Horizontal roller furnace, autoclave lamination, and fully automatic IGU assembly line.

Complete Product Range

Toughened, laminated, insulated, digital printed, curved, anti-burglar, and bullet-resistant glass — all from one processor.

Technical Support

In-house team for glass selection, specification writing, performance calculations, and full project delivery support.

Multi-Stage Quality Control

Raw material verification, in-process inspection, optical and dimensional accuracy checks, and final pre-dispatch quality sign-off on every batch.

Export Experience

Supplying projects across India, East Africa, Congo, Sri Lanka, and expanding international markets.

CONTACT & TECHNICAL SUPPORT

Get in Touch

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Our technical team is available to assist with glass selection, specification writing, performance calculations, and project-specific requirements. Contact us to schedule a technical consultation or to request samples and project pricing.

This catalogue is for reference purposes. Specifications subject to change. Consult IPH Glasses technical team for project-specific recommendations.