

Polarization Based Smart Glass

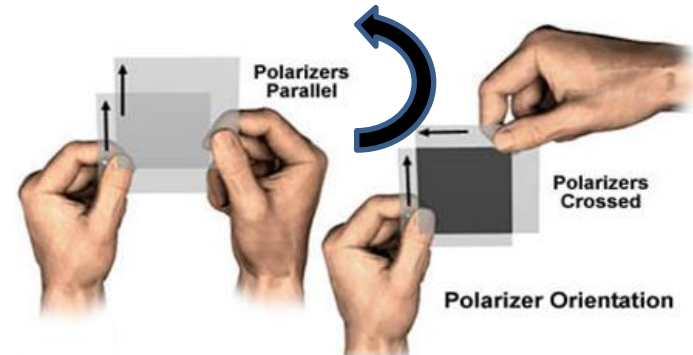
User activated clear to dark
transition without electricity or phase
changing materials

An Overview for Architects

POLARIZATION VIA LINEAR SHIFT

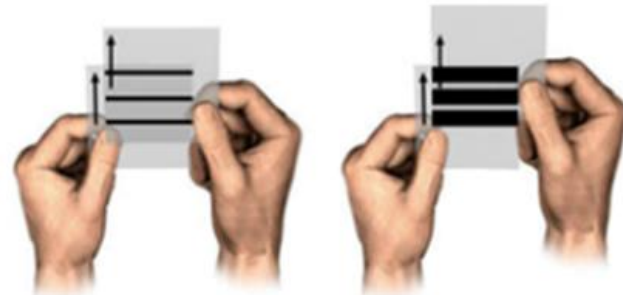
Traditional Approach

With off-the-shelf polarizer, a **rotation** changes light transmission



New Innovation

With a special optical film, a **linear shift** changes light transmission



MOST WINDOWS ARE NOT ROUND, SO A LINEAR SHIFT IS NEEDED

FILM PATTERNING OPTIONS

Invisiblind



Color Options



Decorative



Patterned Images/ Logos



Invisiblind Mirror



SmarterShade



Scaled Up

Scaled Up

Ramp up

Ramp Up

Development

Development

- On Off Capability
- Q2 2015

- On Off Capability
- Q4 2015

- Special patterns/ images (logos)
- Q1 2016

- Special patterns/ images (logos)
- Q1 2016

- Reflects solar heat gain
- Q2 2016

- Continuous shading
- Q3 2016

DISPLAY INDUSTRY FILM PATTERNING CAPABILITY DRIVES HIGH VARIATION IN PRODUCT OPPORTUNITIES

ACTIVATION AND CONTROL

Manual

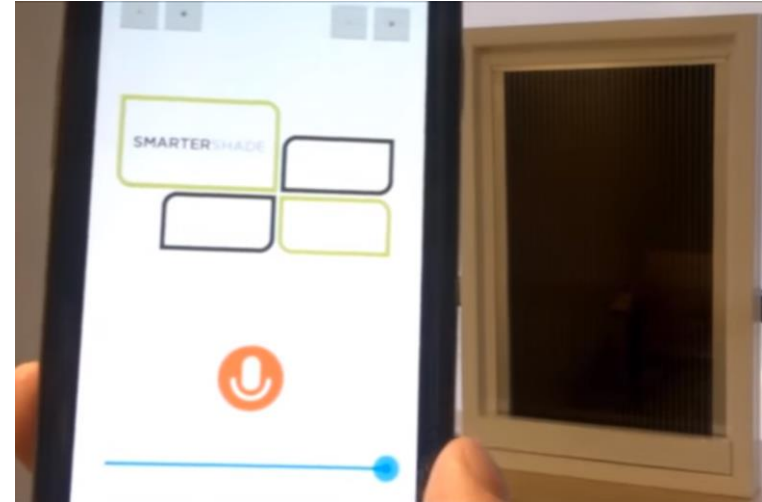


<https://www.youtube.com/watch?v=eMah336OwH0>

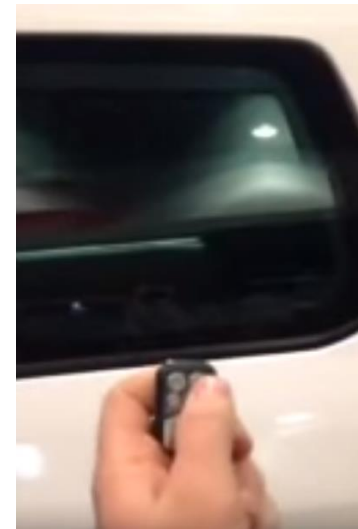


<https://www.youtube.com/watch?v=jyQnJJlZRoQ>

Automated



<https://www.youtube.com/watch?v=XoAKX5Tujm4>



<https://www.youtube.com/watch?v=UmSluaRXgBI>

TECHNOLOGY PERFORMANCE SUMMARY

Unique Benefits

- Same benefits of smart glass* at a fraction of the price
- No phase changing materials (no live chemical reaction stimulated by electricity)
- Some applications use no power at all
 - Option for "smart controls" - smart phone app/ sensors
- Superior interface and durability vs. blinds and shades
- Original Equipment Manufacturer (OEM) and aftermarket formats
- Energy savings – 20% to 30% (through visible and infrared spectrum control)
- Unique ability to create patterns and colors

Other Attributes

- Instant switch
- Privacy level tunable to as low as .002%
- Film web width 1.4M+
- Base materials in production for 20+ years in mature industries
- UV stable (evaluated in a 15 year simulation)
- .20 SHGC ; lower possible in future
- Haze less than 1.5%
- Established supply chain

* Smart Glass is defined as glass that changes opacity when electric current is applied

INTERIOR PRIVACY PANEL PRODUCT SPECS

Sizes

- H1:
 - 16 x 16 inch (standard)
 - 10 x 30 inches (standard)
 - 24 x 30 inches (oversize)
- H2: Up to 36 x 70 inches
- V1: 60 x 70 inches

Features

- Provides 92% visibility
- Manually operated, no wiring or electricity required
- 15 year guarantee on mechanical system
 - Cycle tested to greater than 250,000 cycles
- Fire tested for 30 and 60 minutes in UK
 - North American equivalent (UL) planned in April 2016
- Interchangeable key to operate multiple devices
- Omni-Directional operator design for right and left handed users
- Frameless design
- Patented material and design

Benefits

- Security and dignity of staff and service users assured using silent operation
- Monitor patients easier with near full visibility
- Easy for left or right hand users
- Staff only need to carry one key(lifeline) to operate multi devices
- Quiet operation (controlled closing of glass and optional plastic key)

Beading options

PVC-u Clad, Hardwood and Stainless Steel



Standard vision panel with 45% visibility



IVision panel with 92% visibility

<http://www.intastop.com/site/ivision>

Operation Options



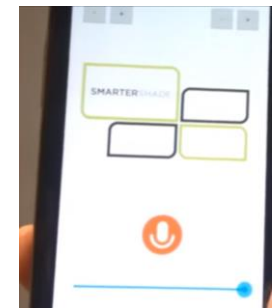
Lever

Key

Knob



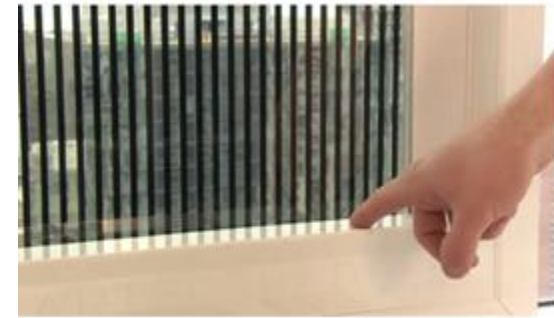
Tab



Motorized with smart phone control

AUTOMATION

- Minimal incremental product cost to automate
- Servo, stepper motors, and linear actuators can all be used for various systems. The governing variable will be orientation of panel movement (side to side vs. vertical).
- Power sources include wired systems and modular power through batteries.
- An electric motor mechanically moves one smart window panel with respect to another. The motor can be controlled remotely through mobile and remote devices, locally on the window.
- Sensors on the smart window can detect the distant movement of the human hand commanding the smart window to operate. Allowing for touchless human interaction.
- Sensors on the smart window can detect occupancy, light and temperature and adapt the level of transmission.
- A centralized controller can communicate with multiple smart windows. This controller can also connect to other systems like the thermostat, the HVAC system, clocks and timers as well as mobile devices and other remote control devices embedded in hospital settings including nurses stations and patient room beds
- Alternative communication protocols can be utilized for different building types



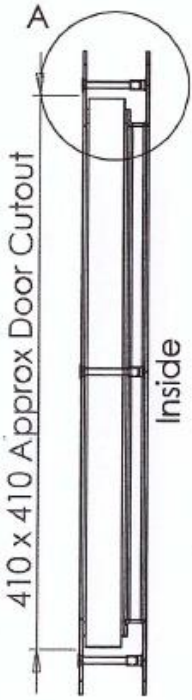
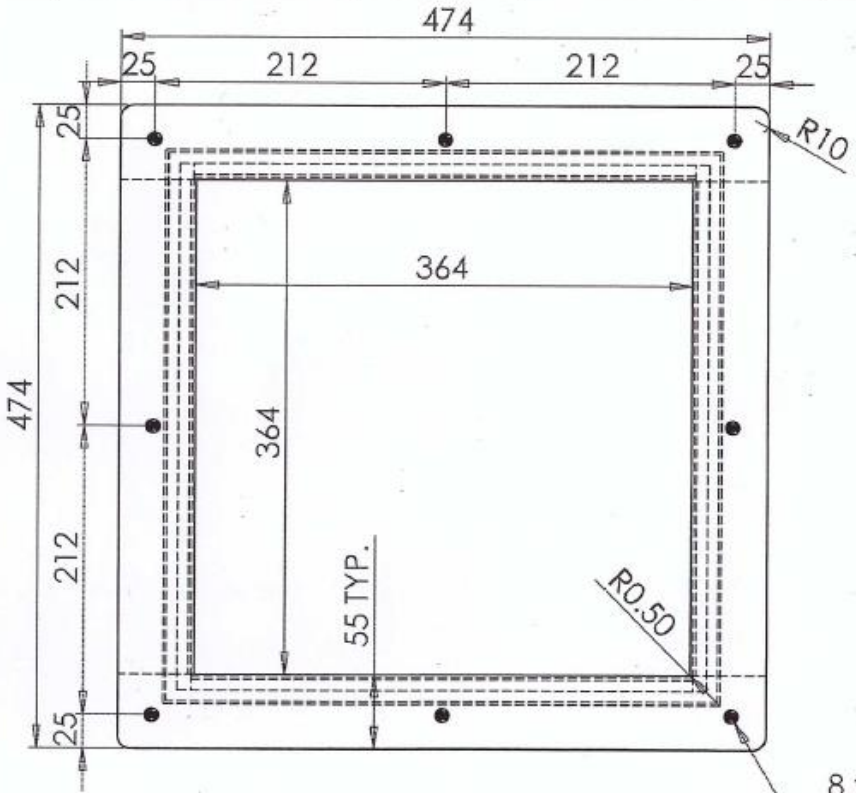
EXAMPLE INSTALLATIONS

Segment	Location	Details	Status
Hospital	United Kingdom	Multiple Hospital- patient room doors	Complete + in progress
Hospital	Japan	Multiple hospital patient and operating rooms	Complete + in progress
Education	Japan	Okegawa City Library	Complete
Office	Japan	Executive office suite	Complete
Automotive	Japan	SEMA Auto Show: aftermarket window in Toyota Landcruiser	6 other active automotive projects in Japan
Office	Chicago, USA	IIT office doors	April 2016
Commercial Window (Retrofit)	Denver, USA	NREL building – Wells Fargo IN2 program	April 2016
Hospitals	Various	VG SmartGlass s specified by RTKL into multiple hospital renovations	Beginning April 2016



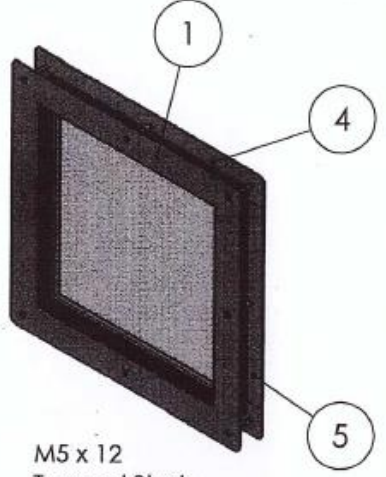
DOOR APPLICATION FRAMING SYSTEM 1

ITEM NO.	PART NUMBER	QTY.	ITEM NO.	PART NUMBER	QTY.
1	INTA SS 100-14 FRONT	1	5	INTA SS 100-14 REAR B	2
2	INTA SS 100-14 INTUMESCENT SPACER	2	6	INTA SS 100-14 INTUMESCENT DOOR LINER	1
3	INTA SS 100-14 CASSETTE	1	7	M5 CSK TORX	8
4	INTA SS100-14 REAR A	2	8	M5 INT. STUD	8



8 x \varnothing 5.10 THRU
 \surd M5 CSK X 90°

ISOMETRIC
 SCALE 1:10



M5 Torxpin Head
 Security SS Fixing
 With Thread Lock

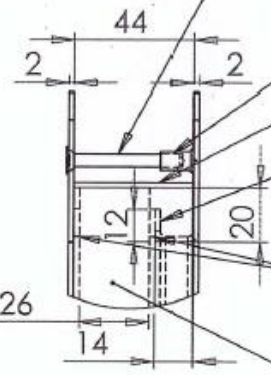
M5 x 12
 Tapped Studs

2mm Intumescent
 Door Liner

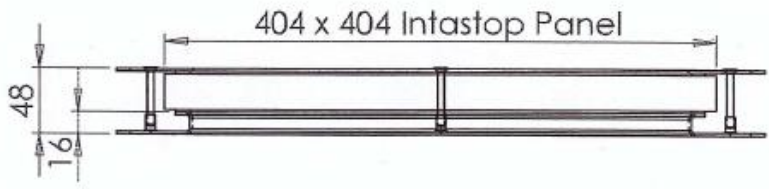
Double Folded
 C/W Softened Edges

2mm Thick Intumescent
 Spacers On Both Sides
 Surrounding Frame

Glass Frame



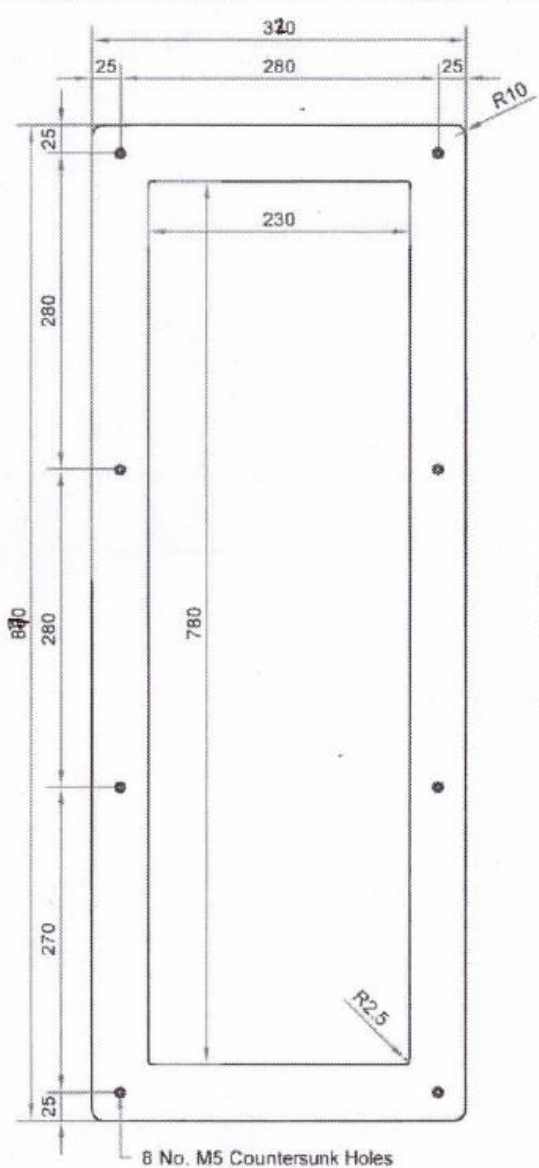
DETAIL A
 SCALE 2:5



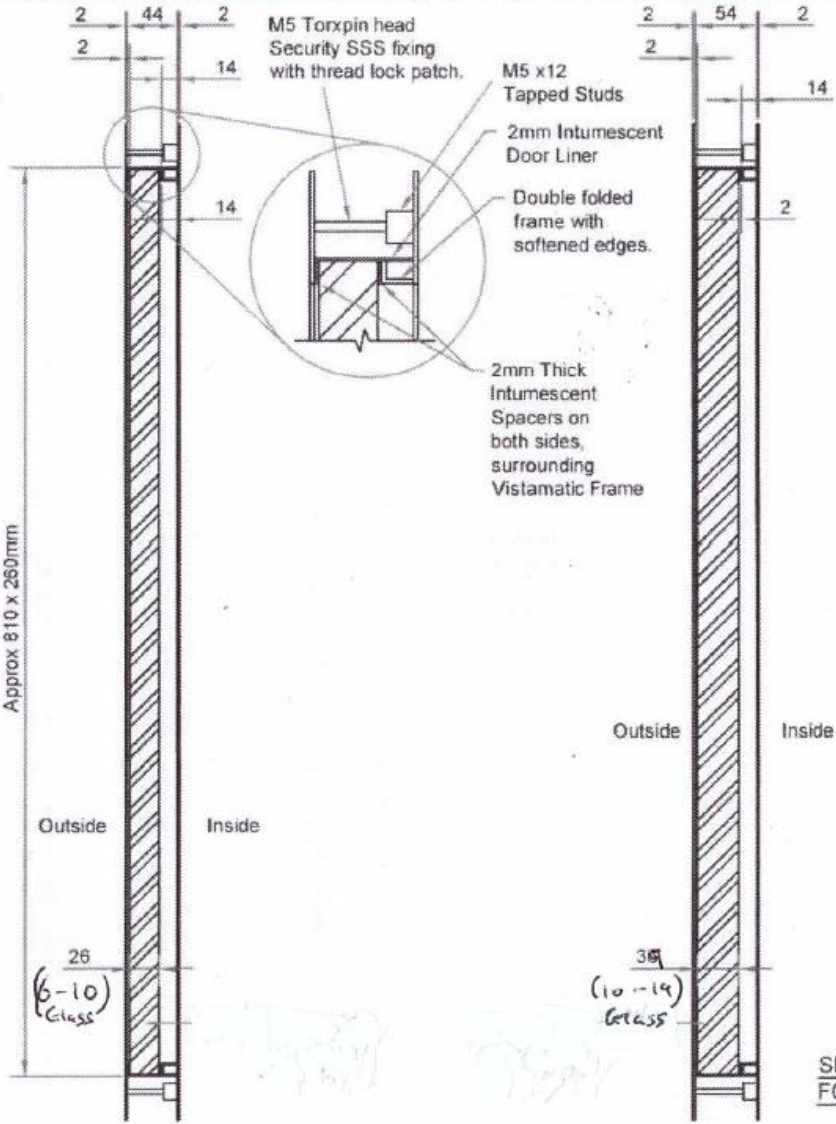
REVISIONS

	Drawn:	Approved:	Material:	Date:
	RAR		As Per Spec.	06/01/2016
Title:				Sheet Size:
474 x 474mm Frame				A4

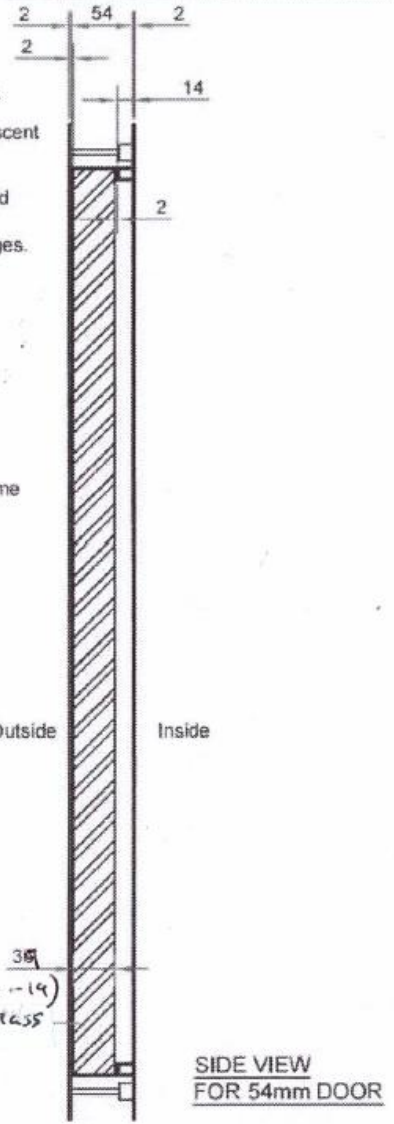
DOOR APPLICATION FRAMING SYSTEM 2



FRONT VIEW

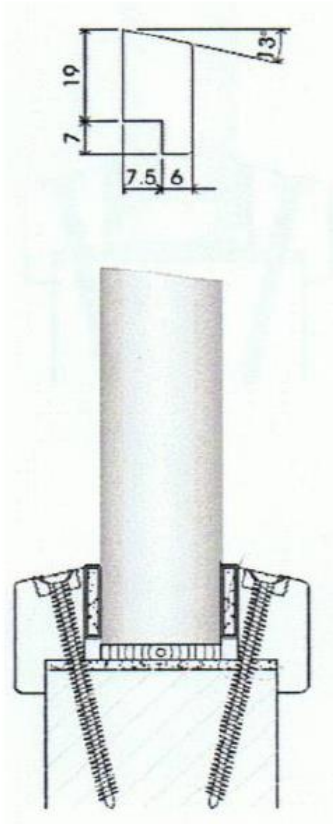


SIDE VIEW FOR 44mm DOOR



SIDE VIEW FOR 54mm DOOR

DOOR BEAD INTUMESCENT DETAIL



Glazing Aperture lining – ISL Thermaline 45x2mm thick

Glazing System – ISL ThermaGlaze 15x4mm thick

Glazing Spacer – 3mm MDF packer

Beading – Hardwood minimum density of 540kg/m³

CONTACT INFO



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