

Multi ***EVASAFE™***



Bridgestone Multi *EVASAFE*TM

- Concept
- Stability and Durability
- Sun Light Control Exposure test & Simulation
- Handling and Storage
- High Mechanical Strength
- Acoustic Performance
- Test Methods and Certification
- Other Features

■ Concept

EVASAFE™



Available in 0.4mm and 0.8mm

The safest and most versatile
solution for Laminated Glass



Multi **EVASAFE™** offers optimized performance for special applications!

Multi **EVASAFE™**

EVASAFE™

MFIF - PET

EVASAFE™

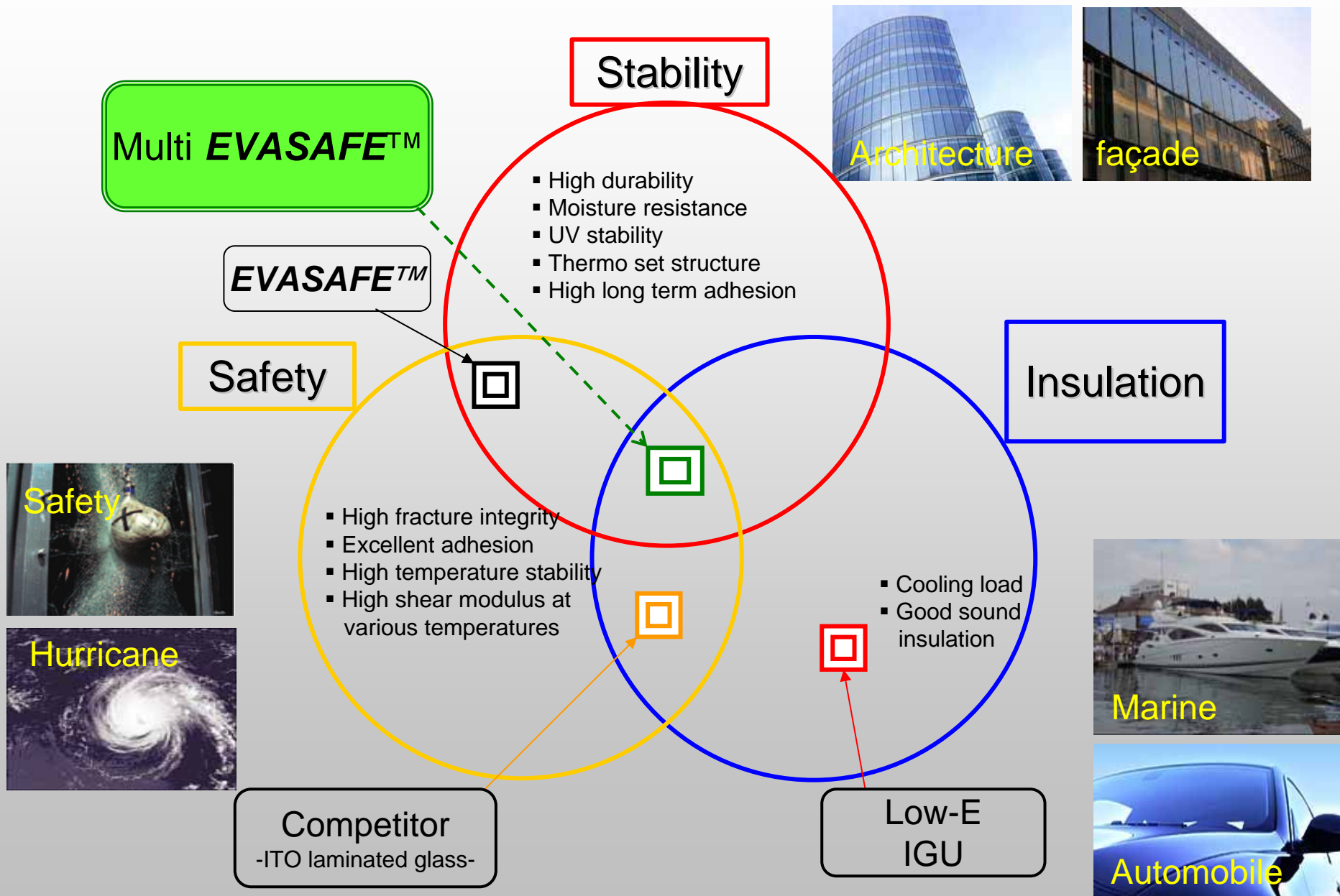


Sandwich-structure

MFIF...Multi Functional Insert Film

- Solar control
- Reinforcement
- Sound control
- Color

■ Concept



■ Stability and Durability

Superior durability under high temp.& humid condition

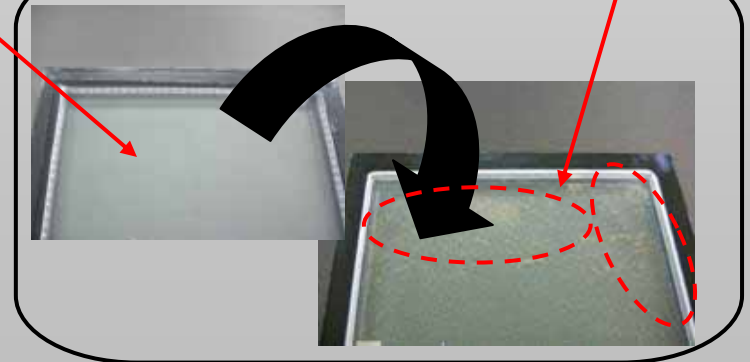
Test method	Condition	Multi EVASAFE FL33.2.1	Low-E FL3*/A6/FL3	Competitor FL33.2
EN12543	50°C/90% 2weeks	No Change	Corrosion	No Change
Bridgestone method	85°C/85% 2000h	No Change	Corrosion	Bubbles

FL3*: Low-E coated glass of 3 mm thickness

- UV cut-off at 400nm
- High sealant compatibility
- High UV resistance

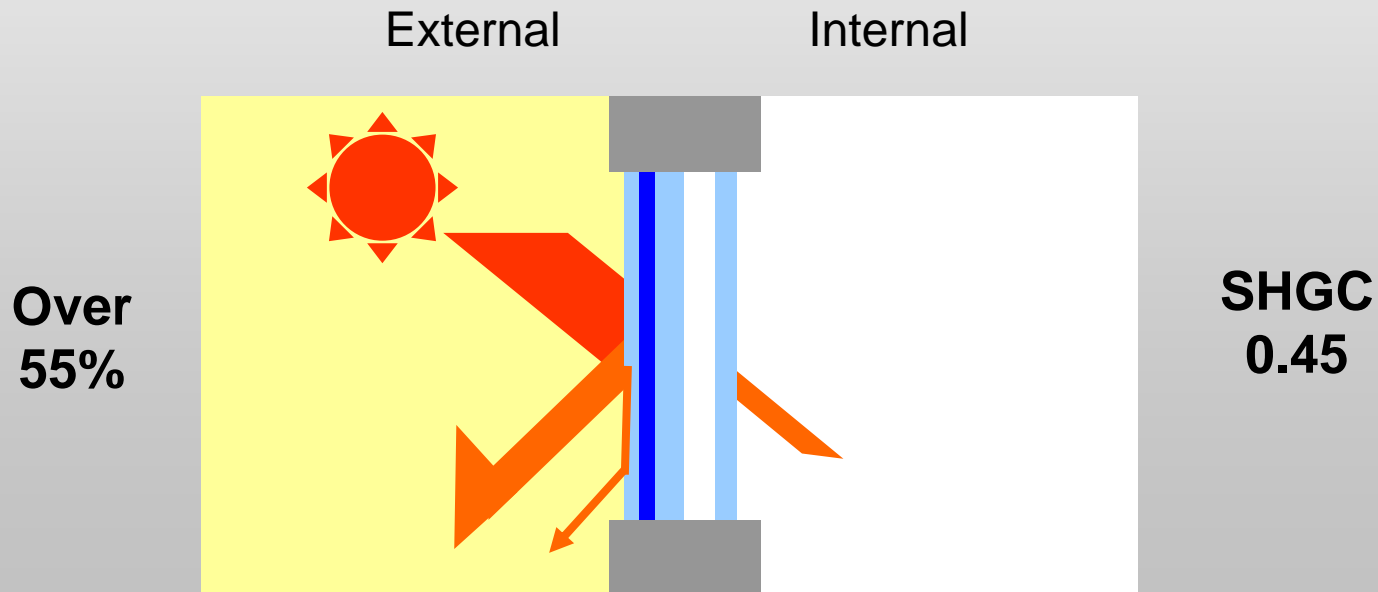
before

after



■ Explanation SHGC - Solar Heat Gain Coefficient

The ratio of external solar heat energy compared to heat distributed through the window



■ Sun Light Control Effect -Exposure test-

Sun light

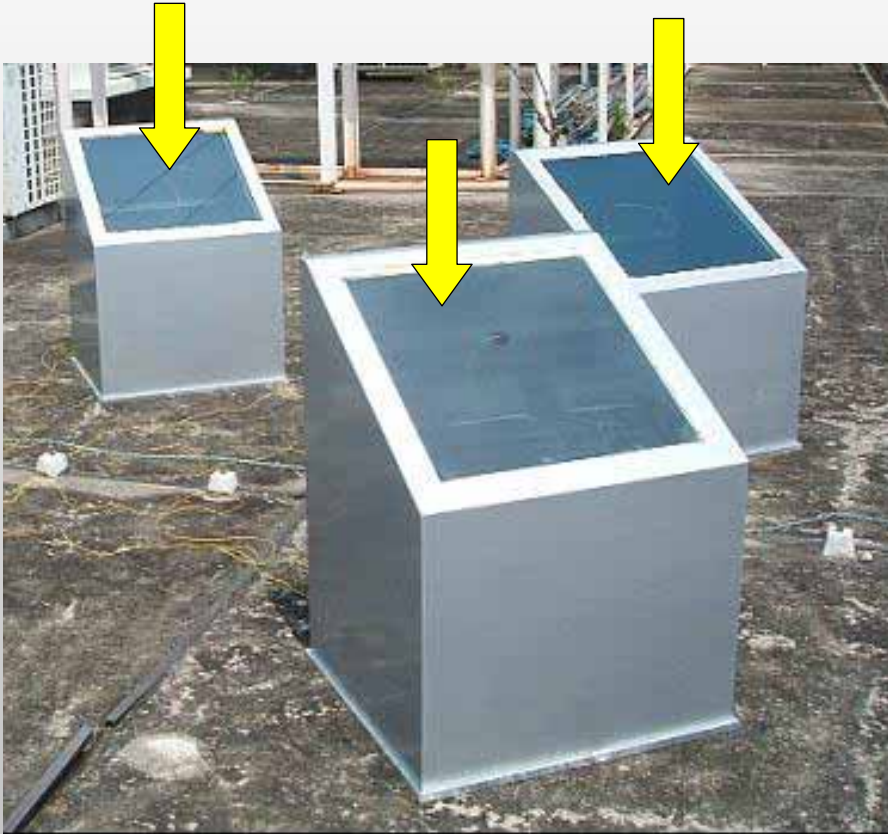
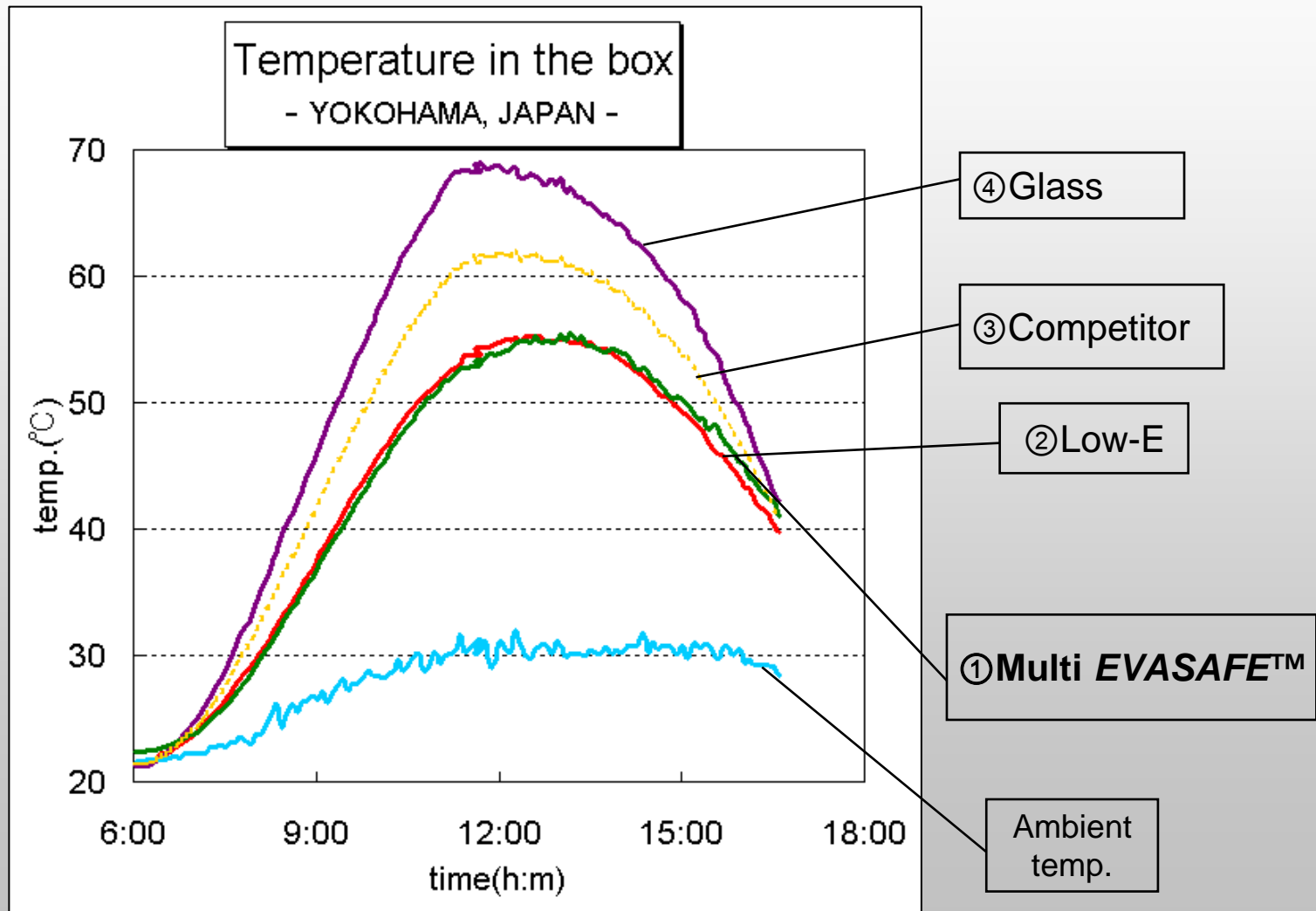


Photo: Bridgestone Japan – Size: 600 x 600mm - IGU

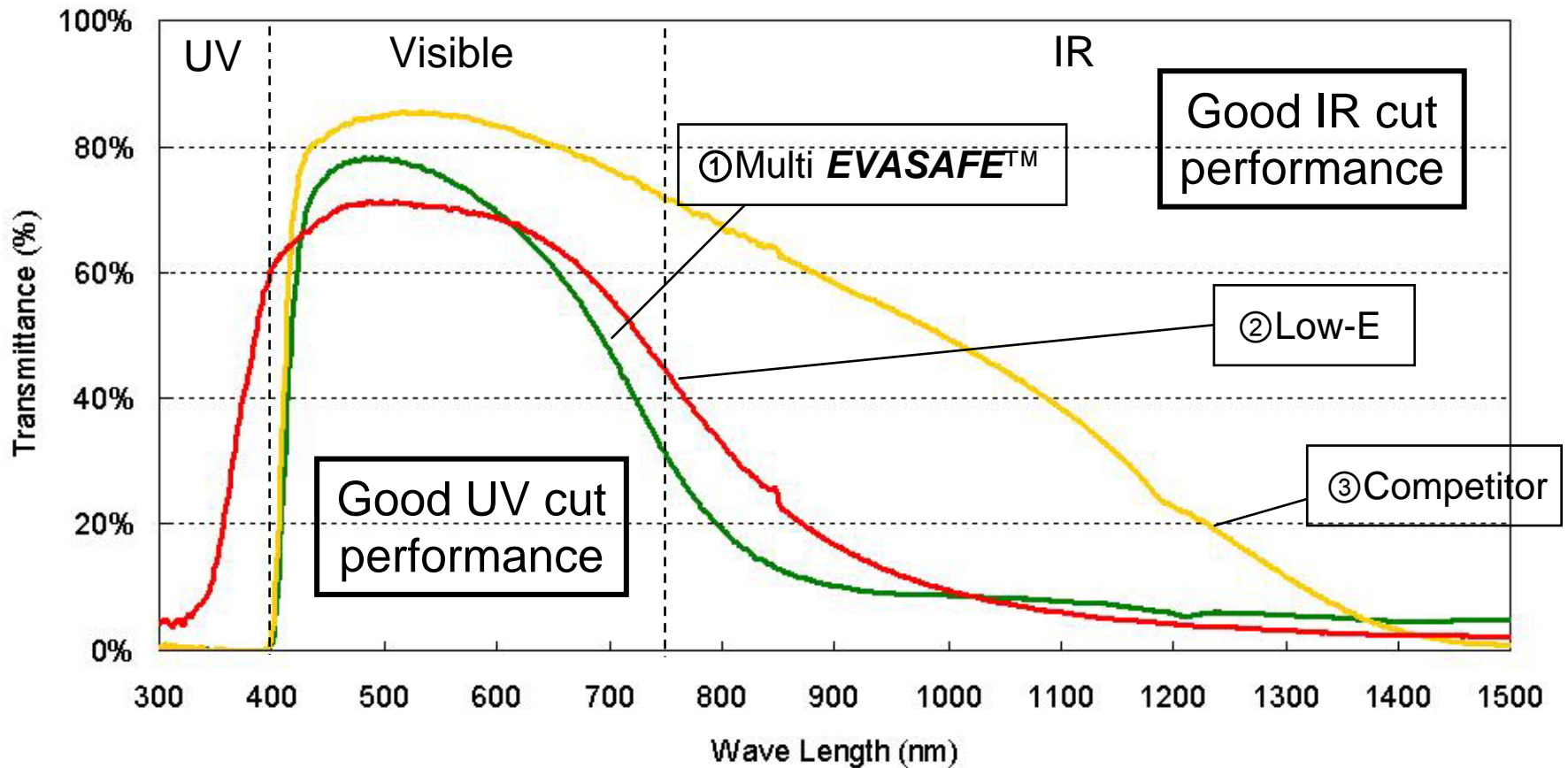
Sample		SHGC	U value (W/m ² · K)
①	Multi EVASAFE™	0.45	2.8
②	Low-E	0.42	2.6
③	Competitor	0.57	2.8
④	Normal	0.79	3.4

■ Sun Light Control Effect -Exposure test-

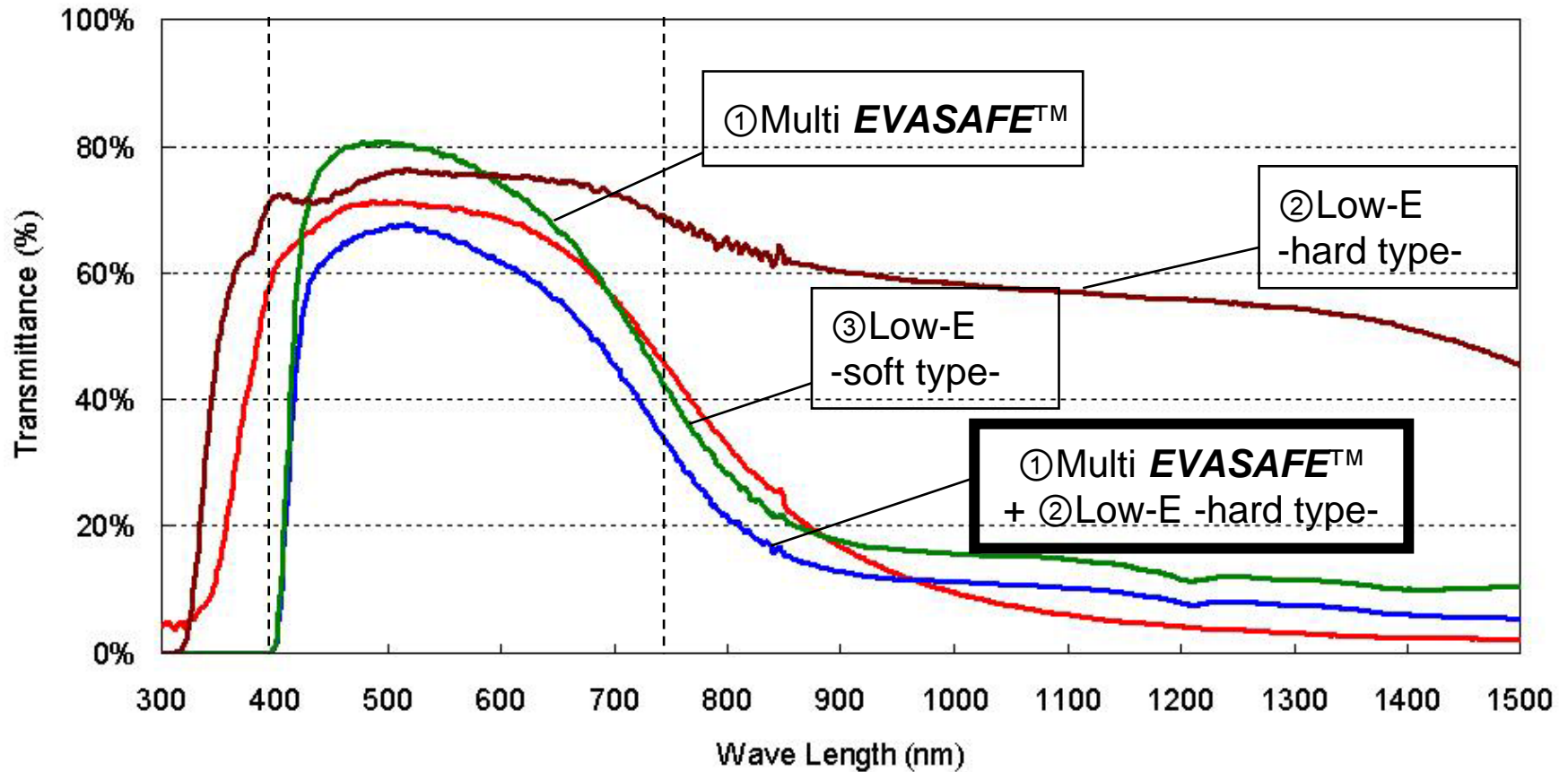


■ Sun Light Control Effect

- SHGC: < 0.5
- High visible light transmittance: > 70%





■ Sun Light Control Effect



Bridgestone Multi *EVASAFE*™ offers high insulation potential when laminating Low-E hard-type glass

■ Sun Light Control Effect -Simulation-

	Residence -Tokyo-	Office -Athens-
Software	SMASH	LESCOM
Building type	Residence	Office
Floor space	84.5m ²	827m ²
		
Conditioning	May-Oct: Air Condition Nov-April: Heater	Only Air Conditioner
Set temperature of facility	26°C (Air Condition) 20°C (Heater)	25°C (Air Condition) 22°C (Heater)
Supported by	Japan Testing Center for Construction Materials	Tokyo University of Science

■ Sun Light Control Effect -Simulation-

Samples	Results*					
	SHGC	U value (W/m ² · K)	Visible light transmittance (%)	Cooling load (kWh/year)	CO ₂ Emission (kg/year)	Reduction ratio (%)
Multi <i>EVASAFE</i>™ Insulating glass	0.45	2.8	78	5334	904	▲22%
Low-E Insulating glass	0.42	2.6	69	5298	900	▲22%
Reference Float glass	0.88	6.0	90	6826	1157	±0%

*supported by Japan Testing Center for Construction Materials

Software: SMASH - Building: residence - Floor space: 84.5m² - City: Tokyo

■ Sun Light Control Effect -simulation-

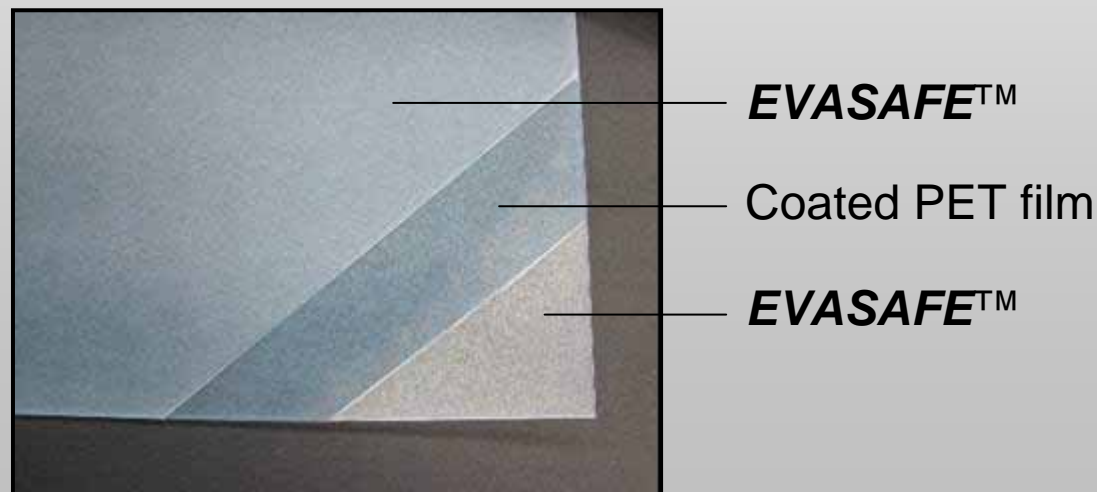
Samples				Results		
	SHGC	U - value (W/m ² · K)	Visible light transmittance (%)	Office -Athens-		
				Cooling load (kWh/year)	CO ₂ Emission (kg/year)	Reduction ratio
Multi EVASAFE™ laminated glass ^{*2}	0.56	5.8	75.5	38,2	12,9	▲14%
Reference Transparent flat sheet glass ^{*3}	0.80	6.0	88.5	43,6	14,8	±0%

*2...FL33.2.1

*3...FL6

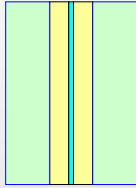
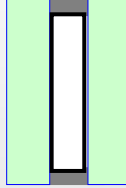
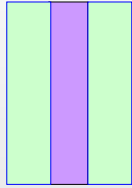
■ Handling and Storage

- Easy cutting, not sticky, low moisture sensitivity
⇒ Storage at room temperature is possible
- Simple lamination process
⇒ Vacuum kiln or autoclave – both is possible
- Sandwich structure
⇒ Shorter assembling times are possible



■ High Mechanical Strength

- Impact Resistance Pendulum Test -

Test	Method	 Multi EVASAFE™ (FL44.2.1)	 Low-E - IGU (FL4*/A12/FL4)	 PVB film (FL44.2)
Pendulum	EN12600	1B1(1.2m)	broken	1B1(1.2m)
Pendulum	ANSI Z97.1	classA(1.2m)		

* 4mm Low-E coated glass

■ High Mechanical Strength

- Hurricane Testing -

Multi **EVASAFE™** offers the possibility
for lamination of Hurricane resistant glazing



Photo: IQInterlayer, Canada

Hurricane Testing	Missile Impact/Cyclic Pressure ASTM E 1886/1996	1524 x 3302mm	10mm annealed glass/0.4mm EVA/PET/2.4mm EVA/PET/0.4mm EVA/10mm annealed glass	Passed
	Missile Impact/Cyclic Pressure ASTM E 1886/1996	1524 x 3302mm	6mm tempered glass/0.8mm EVA/PET/2.4mm EVA/PET/0.8mm EVA/6mm tempered glass	Passed

■ Test Methods and Certification

North American Accreditation

Miami Dade Testing	Ignition temperature of Plastic ASTM D1929	3g (appr. 13mm x 13mm)	Interlayer only	Passed
	Rate of Burn ASTM D635	13mm x 125mm	FL3/0.4mm EVA/ 125µm PET/0.4mm EVA/FL3	Passed
	Smoke Development ASTM E2843	25mm x 25mm	FL3/0.4mm EVA/ 125µm PET/0.4mm EVA/FL3	Passed
	Xenon Arc Test ASTM G155 (4500hrs) Flexural Properties	64mm x 152mm	FL3/0.4mm EVA/ 125µm PET/0.4mm EVA/FL3	Passed
NFRC 300 Test (Transmittance – Front, Reflectance – Front and Back)	NFRC 300-2004	100mm x 100mm	FL3/0.4mm EVA/ 125µm PET/0.4mm EVA/FL3	Passed
Safety Glazing (ANSI Z97,1 – 2009, 16 CFR PART 1201 CAN CGSB-12,1M90)	Impact Test ANSI, CPSC, CGSB (Composite)	864mm x 1930mm	FL3/0.4mm EVA/ 125µm PET/0.4mm EVA/FL3	Passed
	Boil Test	305mm x 305mm	FL3/0.4mm EVA/ 125µm PET/0.4mm EVA/FL3	Passed
	Weathering Test ASTM G155 (3000hrs) Visible light, Yellowness Index, Haze, Delta E	51mm x 152mm	FL3/0.4mm EVA/ 125µm PET/0.4mm EVA/FL3	2 out of 4 Passed

■ Test Methods and Certification

Bridgestone EN Testing

EN 12543-4 – Durability:
FL33.2.1 (PET)

EN 356 – Ball drop:

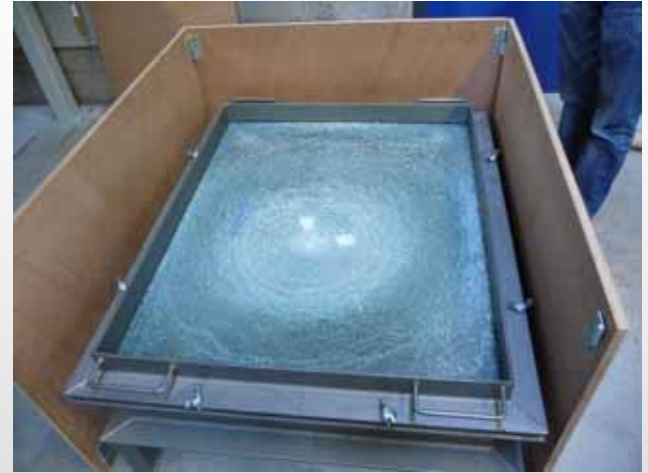
P2A (3m): FL44.4.1 (PET)

TP44.2.1 (PET)

P4A (9m): TP55.4.1 (PET)

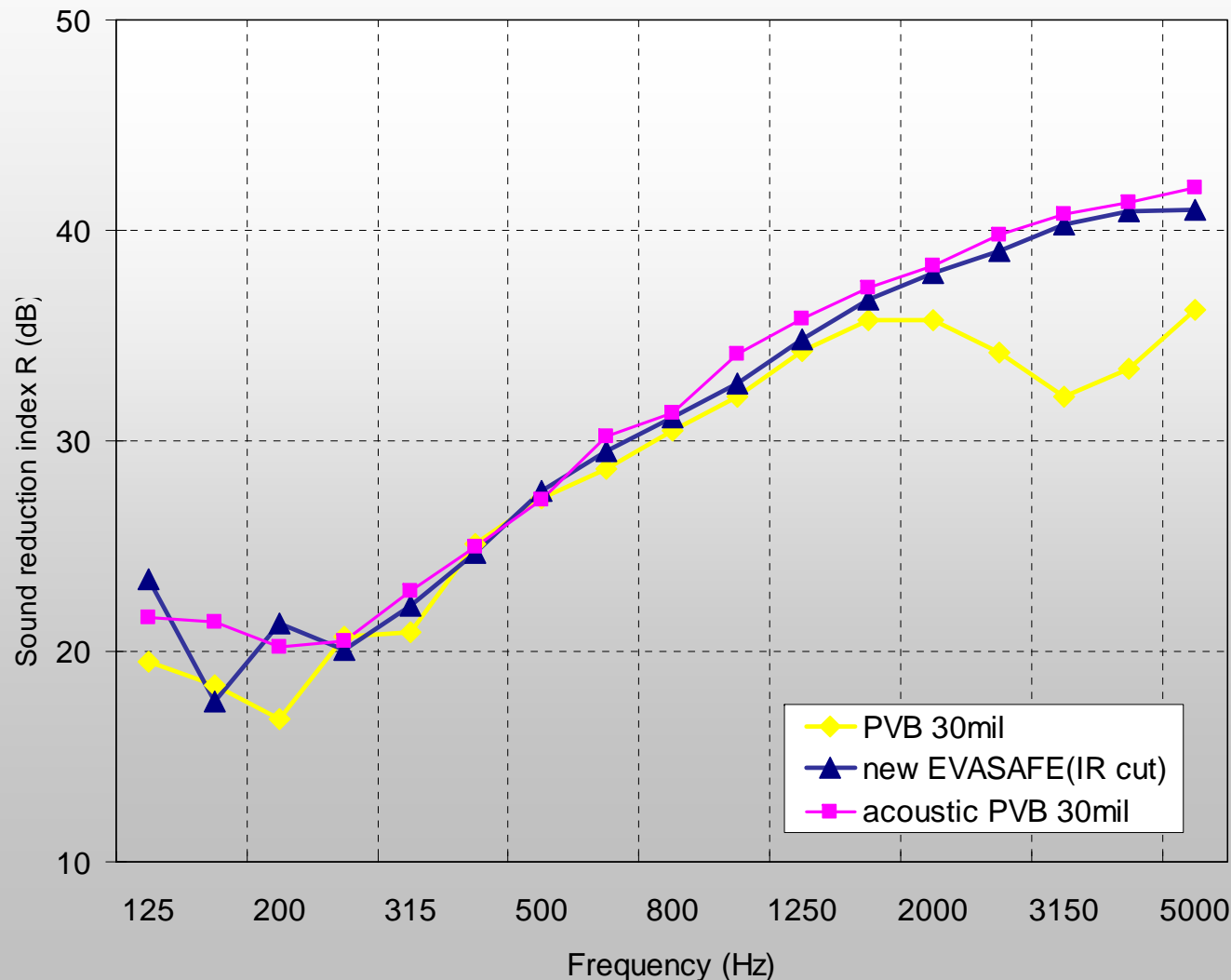
EN 12600 – Pendulum:

1(B)1 (120cm): FL44.2.1 (PET)



■ Acoustic Performance

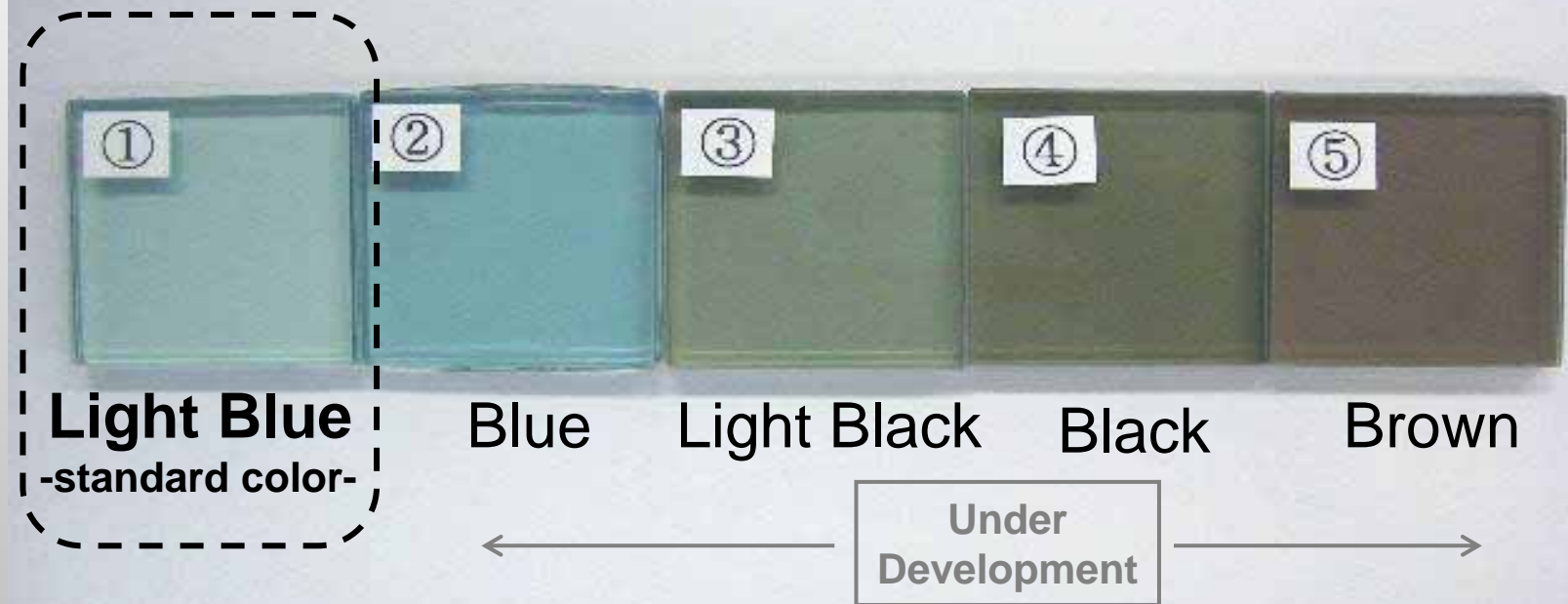
- Sound Insulation as good as acoustic PVB -



Sound insulation
Performance is
increased by
adding a
insert material!

■ Other Features - Color

- Standard color: Light blue
- Other colors are possible – depending on requested amount

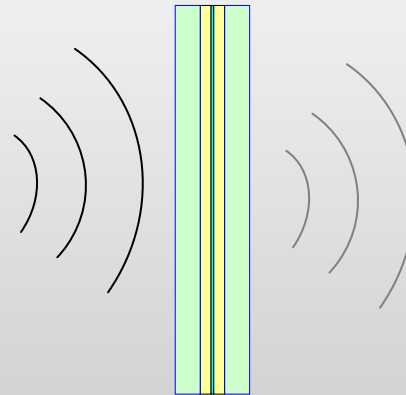


■ Other Features

- Use of MOBILE PHONES is easily possible -

Multi
EVASAFE™

Easy to
Connect



Electrical waves can pass without any interference
due to non metallic coating!

Thank you for your attention!