



United States Department of State

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Bureau of Diplomatic Security
Physical Security Division
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FROM: DS/PSP/PSD – Division Director, David Sparrowgrove

SUBJECT: Notice to Manufacturers: DS Certified Forced Entry Ballistic Resistant (FE/BR) Glazing Systems Incorporating Non-Proprietary SentryGlas Xtra (SGX) Interlayer Product

In December 2019, the Bureau of Diplomatic Security (DS) conducted a series of forced entry and ballistic resistant (FE/BR) tests of glass laminates utilizing the new SentryGlas Xtra (SGX) interlayer product line. This memo provides the results of that test series and the process associated with adapting them into your respective product lines.

Central to this work is a new laminated glass interlayer product developed by Kuraray called SentryGlas Xtra (SGX)¹. When compared to traditional SentryGlas (SG), Kuraray's new SGX product line provides better adhesion between glass and interlayer and better optical clarity (i.e. less "haze") in laminated glazing systems. A significant advantage of SGX is that, unlike the original SentryGlas, there is no need to differentiate between the air and tin side of glass, or utilize an adhesion promoter, when manufacturing laminated glass products.

In addition to utilizing SGX mentioned in the paragraph above, the FE/BR glazing formula below accommodates ¼" annealed glazing and thinner SGX interlayers. All of these FE/BR options feature commercially available spall retention layer that is incorporated into the glazing system during initial manufacture.

DS Certified FE/BR glazing systems: The below layups passed the SD-STD-01.01 Rev G (Amended) certification for 15-minute FE and Rifle BR:

DOS Layup 2 (Rev G) 1123, 2.392" Thick (abbrev. "DOS2")	DOS Layup 3 (Rev G) 1123, 2.392" Thick (abbrev. "DOS3")
1/4" annealed glass	1/4" annealed glass
.1" SGX	.1" SGX
1/4" annealed glass	1/4" annealed glass
.1" SGX	.1" SGX
1/4" annealed glass	1/4" annealed glass
1/2" air gap	1/2" air gap
1/4" heat strengthened glass	1/4" annealed glass
.1" SGX	.1" SGX
1/4" heat strengthened glass	1/4" annealed glass
.1" SGX	.1" SGX
1/4" heat strengthened glass	1/4" annealed glass
.025" TPU	.025" TPU
Madico CL 700 SRB TPU (autoclave adhered PET film)	Madico CL 700 SRB TPU (autoclave adhered PET film)

DOS Layup 4 (Rev G) 1123, 2.392" Thick (abbrev. "DOS4")
1/2" annealed glass
.2" SGX
1/2" annealed glass
1/2" air gap
1/4" heat strengthened glass
.2" SGX
1/4" heat strengthened glass
.025" TPU
Madico CL 700 SRB TPU (autoclave adhered PET film)

All of the dimensions listed above represent the minimum ("baseline") configuration required to meet the Department of State's FE/BR performance standards when installed in a typical FE/BR "punched" window frame that provides approximately one inch of glazing bite. Project-specific glazing layups may exceed any of the glass thicknesses, SGX laminate thicknesses, or other parameters (e.g. making the air gap or frame bite larger) listed here following a DS Technical Review. Additionally, low-emittance (low-E) coatings or glass tinting will not affect the glazing system's FE/BR performance. FE tests performed on SGX-laminated specimens revealed that larger samples performed as well or better than smaller ones. The practical implication of these tests is that an upper boundary for these glazing system's size in DS-certified assemblies is approximately 6 feet by 12 feet.

To adapt any of the above non-proprietary layups into a specific FE/BR Certified product a manufacturer should apply for Technical Review (TR) to receive a new

DOS model number for the system. Manufacturers will not be required to replicate FE/BR testing to utilize these glazing layups. DS will not accept a TR request for substitution of SG for SGX in the above layups.

The Bureau of Diplomatic Security continues to perform research and testing on FE/BR systems and SentryGlas and SentryGlas Xtra. DS anticipates future changes in layup designs in order to adapt to changing requirements and emerging threats. Questions regarding this document or implementation of these FE/BR glazing systems should be directed to Russ Norris at NorrisRJ@state.gov, Alec Williamson at WilliamsonAA@state.gov, Keith Nelson at NelsonKM1@state.gov, or Jessica Inman at InmanJJ@state.gov.

Footnote 1: Kuraray Trosifol SentryGlas® Xtra™ Technical Data Sheet (<https://www.trosifol.com/salesupport/downloads/product-brochures/>)



Curbell Plastics is a proud supplier of Kuraray materials.