# CASE STUDY: Toll gate booths across Indonesia are safer with LLumar

## Building
*Toll Gate Booths*

## Location
*Jakarta, Indonesia*

## Window Film
*SCL SR PS4 (Clear)*

## Type
*Safety and Security Film*


## SITUATION

Indonesia opened its first toll road in 1978. Today, vehicles stop at various locations on the major highways to pay tolls. Dealing with traffic congestion and frustrated drivers can make working in the toll booth a dangerous job. There is always the possibility of an accident or a robbery. To create a safer work environment, the mass transit authority sought a cost effective, retrofit solution to upgrade the glazing without replacing the glass.

## SOLUTION

Our LLumar distributor specified LLumar SCLSRPS4 clear safety and security film for the toll booths. The film not only holds glass shards together in the event of breakage, it also helps shield employees from harmful ultraviolet rays. The film's scratch-resistant coating will keep it looking new for years to come. Phase I of the project stretches from Jakarta's International Airport to the suburbs. It includes 14 gates (8 toll booths per gate). According to the distributor they plan to install the film on every toll gate in Indonesia.

## RESULT

"The film is an invisible barrier that does not obstruct our view. Our employees can see each driver's face from inside the booth and feel secure," said Mr. Saud, Supervisor, Gerbang Tol CTC.

## Performance Data

| | % Total Solar Transmittance | % Total Solar Reflectance | % Total Solar Absorptance | % Visible Light Transmittance | % Visible Reflectance (exterior) | % Visible Reflectance (interior) | Winter U-value | Shading Coefficient | % Ultraviolet Ray Protection (wavelengths 280-380nm) | Emissivity | Solar Heat Gain Coefficient | % Total Solar Energy Rejected | Light-to-Solar Heat Gain Ratio (LSG) | % Summer Solar Heat Gain Reduction | % Winter Heat Loss Reduction | % Glare Reduction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Clear Glass | 83 | 8 | 9 | 90 | 8 | 8 | 1.03 | 1.00 | 29 | 0.84 | 0.86 | 14 | 1.05 | – | – | – |
| **Clear Series** | Clear safety films can be applied over tinted glass to improve aesthetics, solar performance and glare. These thicker films meet the most stringent standards for burglary resistance, blast mitigation, wind-borne debris, and basic safety glazing. | | | | | | | | | | | | | | | |
| SCL SR PS4 | 82 | 10 | 8 | 88 | 10 | 10 | 1.05 | 0.97 | 94 | 0.86 | 0.84 | 16 | 1.05 | 2 | -1 | 2 |

## Physical Properties

| | Film Thickness (inches) | Appearance | Film Structure | Tensile Strength (constructed) | Tensile Strength (average as reported) | Break Strength (peak load) | Break Strength (average load) | Elongation at Break | Peel Strength | Puncture Strength |
|---|---|---|---|---|---|---|---|---|---|---|
| SCL SR PS4 | 0.004 | Clear | Single | 34,555 | 32,000 | 135 | 133 | >100% | >2720(>6) | 70 |

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