

# Ircon® System Solutions – Glass

## Bulletproof Glass – Bending

### Customer

Glass Mfrs.

### SIC code

3211, 3231

### Application

#### Customer Needs

All over the world there are companies that make bulletproof glass for the automotive industry. They make the windscreens, the rear lights and the sidelights of multiple layers of glass with plastic film laminated in the middle. The final product may have many layers of glass and film.

The applications are the same as normal automobile windows so the applications are similar. First they have to bend the glass. This is usually done in a hot air oven or electric heated oven and the glass is bent using a process called sag bending. The glass is hot enough to sag down into a mold. The two kinds of ovens used are a straight line oven and the other is called a coffin oven. In the straight line oven, the glass moves from one end of the oven to the exit and is heated until the glass sags into the mold. On the coffin oven the glass is placed with the mold into a large box (looks like a coffin) and put into the oven. As one box goes in one comes out. There are heaters on top of the oven which heat the glass and it sags into the mold.

On all of these ovens the glass temperature is critical. There are often three zones of heating and each zone needs 3 instruments for the 2 edges and the center of the glass. The 5 micron Modline 47 series can look into the oven and not be bothered by reflections. This means it provides the actual glass temperature. Thermocouples in the oven only give the operator the air temperature not the glass temperature. An air purge and water cooling attachment will be required for this application.

#### Features/Benefits to address

##### Product

- Modline 47 Series  
(no problems with reflections from the oven).

##### Application

- They have to bend all of the pieces at the same time to insure proper bend. This could mean 4-8 pieces of glass at one time. If the glass is not bent properly then they scrap a lot of glass.

#### Who to talk to?

1. Production Engineer
2. Quality Engineer

#### What to take?

1. Modline 47 Series and related literature



*Glass coming out of a sag bending oven*

#### Names of customer

The following website provides a listing of companies that specialize in laminated glass (for bulletproof windows and many other applications) in Canada and the United States.

<http://lgic.glass-info.com/resource/manufacturers.asp>

Also a quick web search for bulletproof glass reveals many specialty manufacturers.