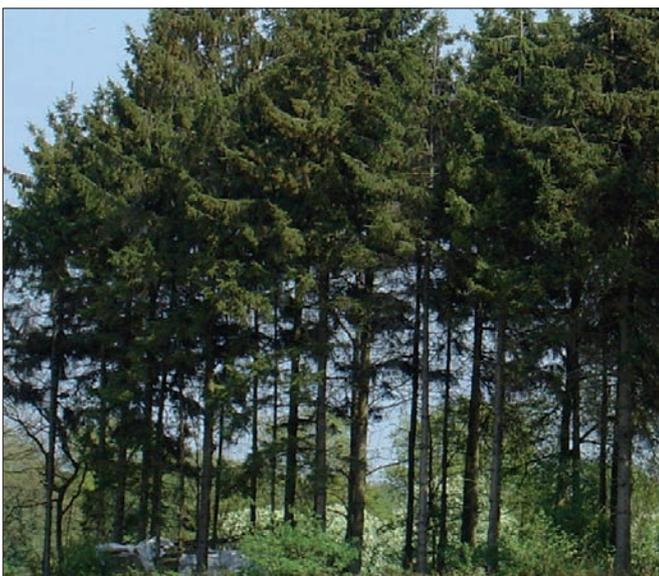




## Safety glazing as strong as an oak for optimum protection of drivers with a 360 degree view



Project: Windows for the driver's cab in the E models from John Deere  
Customer: John Deere, Bruchsal, Germany  
Market segment: Industry  
Product: Makrolon® GP 099  
Fabricator: KRD Sicherheitstechnik GmbH, Geesthacht

# Safety glazing as strong as an oak for optimum protection of drivers with a 360 degree view

Many can't see the wood for the trees. And that is when safety is at a premium. Forestry workers process mainly large trees in their daily work and so are not just exposed to the weather but also to the considerable dangers posed by these wooden giants. Serious injuries are not infrequent. Therefore optimum safety equipment is of especial importance for forestry work. That is why John Deere, the leading global manufacturer of forestry vehicles, relies on Makrolon®.

## Safe behind the window pane

Since safety is the non negotiable, John Deere has fitted its E models, a new range of forestry vehicles, with highly shatter-resistant windows. But they did not select Makrolon® GP 099 sheets by chance. Thanks to their high impact strength and rigidity the massive 12 mm thick polycarbonate sheets prevent falling objects, such as large branches, stones or broken rope wires in cable winches, from crashing into the cabin and injuring the driver.



## Extreme impact strength speaks for itself

In addition, Makrolon®- sheets from Covestro comply with requirements that are among the most stringent with regard to driver and passenger safety in vehicles. For example, they have passed the FOPS test (falling object-protective structures) defined in ISO 8083 without any problem. In this test a long cylindrical steel body is dropped onto the sheets with an impact energy of 5,800 or 11,6000 Joule (depending on whether the pane is fitted horizontally or vertically in the vehicle). They have also passed the OPS test (operator protective structures) defined in ISO 8084 with flying colours. This tests the static load capacity of panes with a force of 17,800 Newtons. In contrast to glass and laminated glass, Makrolon® sheets do not splinter and break when under load, which means optimum safety for the operator in the driver's cabin.

## Keeping a clear view

The cabins in the new John Deere harvesters and forwarders have been fitted with rounded panes, not just for design purposes but also to provide a better all-round view. Here, too, Makrolon® has proved itself to be the ideal material since it is so easy to form. The sheets are formed, coated, trimmed and a glue primer is added to the edges by KRD Sicherheitstechnik GmbH. KRD has succeeded in ensuring a high optical quality of the sheets, comparable with car windows, even after forming thanks to its special thermoforming process.

Even during the production stage, Covestro placed special emphasis on the excellent optical quality of the sheets. The 1576 mm long and up to 1128 mm thick front windows made of Makrolon® GP 099 sheets were extruded to ensure that no inclusions or cords were created that could affect the driver's sight and tire his eyes. Distortion of the sheets had to be reduced to maximum values of 0.06 dioptres.

Finally the sheets were given a hard coat which ensures scratch and weather resistance which approaches that of glass.

Thanks to Makrolon® the drivers in the John Deere E models have optimum protection while keeping a clear view.

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