



## FUNCTIONAL FILMS

Freedom of design with scratch-resistant products



**MAKROFOL®**

# Introduction

Our films can do a lot more than might be expected, considering the properties of the plastics on which they are based. By structuring the surface, adding additives or fillers, applying a coating or coextruding them, we give the films a number of additional properties and functions, such as high scratch resistance, excellent UV stability and special light diffusion characteristics.

We market a wide variety of high-quality technical films based on polycarbonate to cover an enormous range of properties. Just about every industry benefits from the advantages of our films, including the automotive, electrical/electronics, packaging, lamp and lighting industries, IT and medical technology, manufacturers of ID cards and documents, and producers of graphics printing systems. In this brochure, we would like to tell you about the almost unlimited possibilities offered in particular by our scratchproof-coated Makrofol® films, and to help you choose the right type of film for your application.

Makrofol® HF is a new product family of polycarbonate films that can be shaped despite their scratchproof coating. They are coated with a dual-cure system that is still formable and undergoes final curing with UV light once the forming process has been completed.

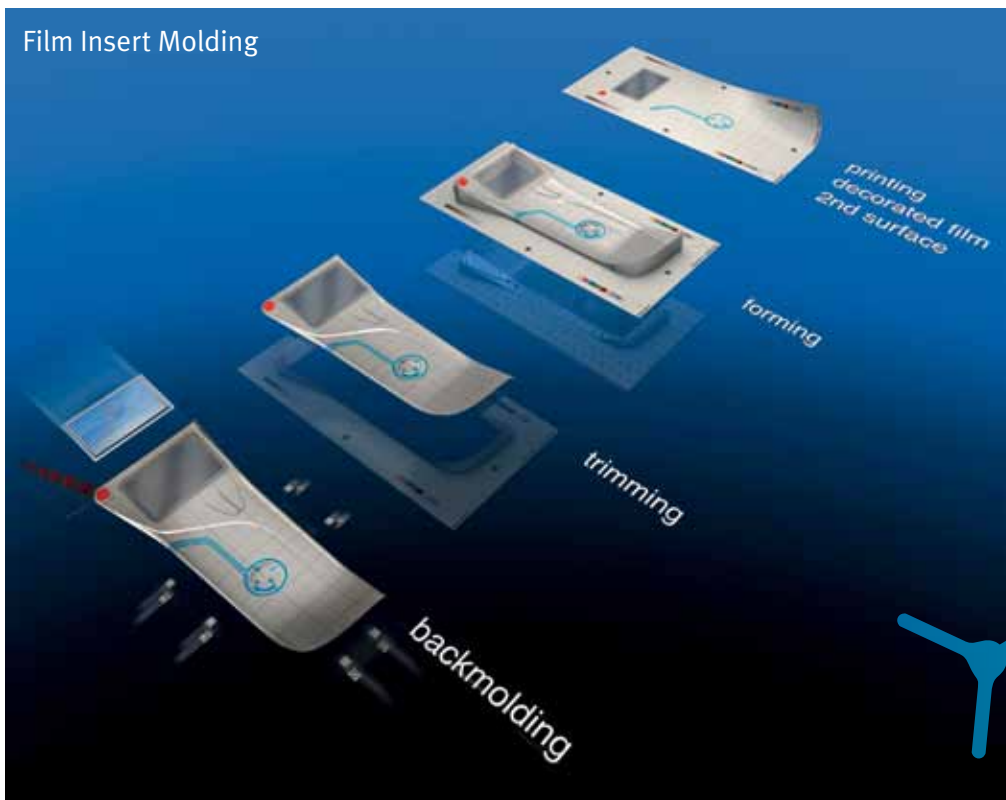
The first of this product family is Makrofol® HF278. The film produces surfaces with a deep-gloss finish (piano effect), has excellent chemical resistance and high abrasion resistance. It achieves a 1H rating on part in the pencil hardness test according to ISO 15184 (500 g), for example. The film can be shaped with narrow radii and a high depth of draw. It is available in thicknesses of 190 µm, 265 µm and 390 µm, with other thicknesses on request.

Makrofol® HS is a family of scratch and chemical resistant polycarbonate films in which the coating system has already cured. Consequently, the films are no longer formable but can be used for 2D applications. They are also characterized by their outstanding mechanical and chemical resistance.

We also have developed a formable coextruded film, Makrofol® SR253, whose chemical and abrasion resistance lie between the top performance of Makrofol® HF and the typical ones of standard PC films.

# Process description

The backmolding of pre-molded plastic films (film insert molding – FIM) is an established process technology in a wide variety of applications, such as backlit functional trim in the automotive sector or decorated plastics in consumer articles such as mobile phone shells. Combined with coatings and printing, innovative designs, functions and surfaces can be created from one piece in a single mold.



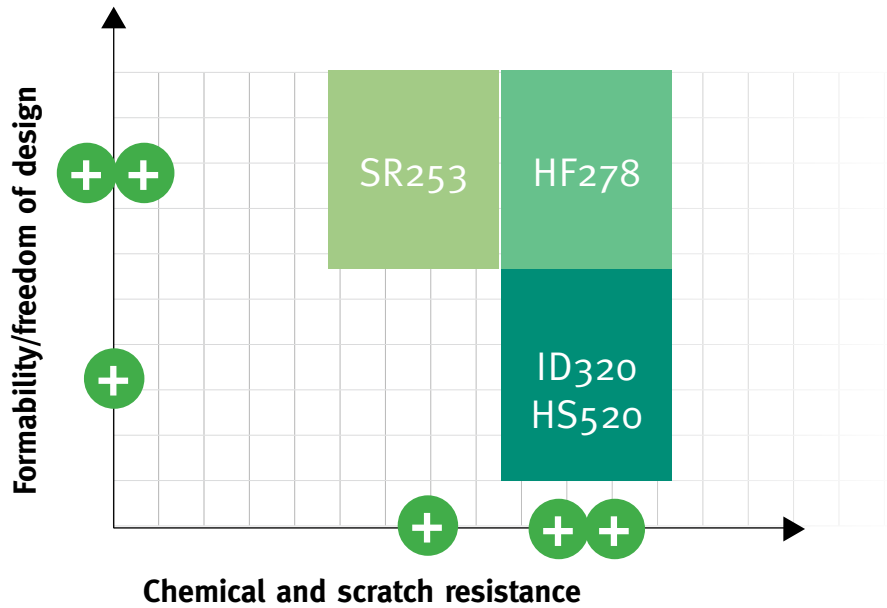
If you are looking for excellent gloss, outstanding surface hardness plus very good abrasion and chemical resistance for your application – and with narrow radii as well –, you have already found it.

**Our range of scratch-resistant Makrofol® films!**

The image is a conceptual design sketch. At the top, there are several scribbled lines in black and a glowing cyan blue light emanating from a circular form. Below this, the text "Freedom of design with coated products" is written in a white, italicized serif font. The background features a dark, sleek car body with a prominent wheel and a glowing cyan blue light source. In the foreground, a curved, light-colored surface is shown with a grid of glowing cyan blue squares. The overall style is artistic and futuristic, with a focus on light and form.

*Freedom of design  
with coated products*

# Put your family together



	Product	Formable	Abrasion resistance	Surface gloss	Other characteristics
Non-formable	Makrofol® HS520		Very good	Glossy	Standard grade
	Makrofol® ID320		Very good	Glossy	Thin overlay for ID cards
Formable	Makrofol® HF278	✓	Very good	Glossy	Normal light processing
Formable	Makrofol® SR253	✓	Good	Glossy	Without UV Curing

## Hardcoated films for flat surfaces

**Makrofol® hardcoat standard**

**Makrofol® HS520:** glossy surface

- + Non-formable films
- + Very good chemical resistance
- + Very high abrasion resistance
- + High gloss level (like black piano effect) with glossy films



## Standard hardcoated films

### Makrofol® ID320, overlay film for identity documents

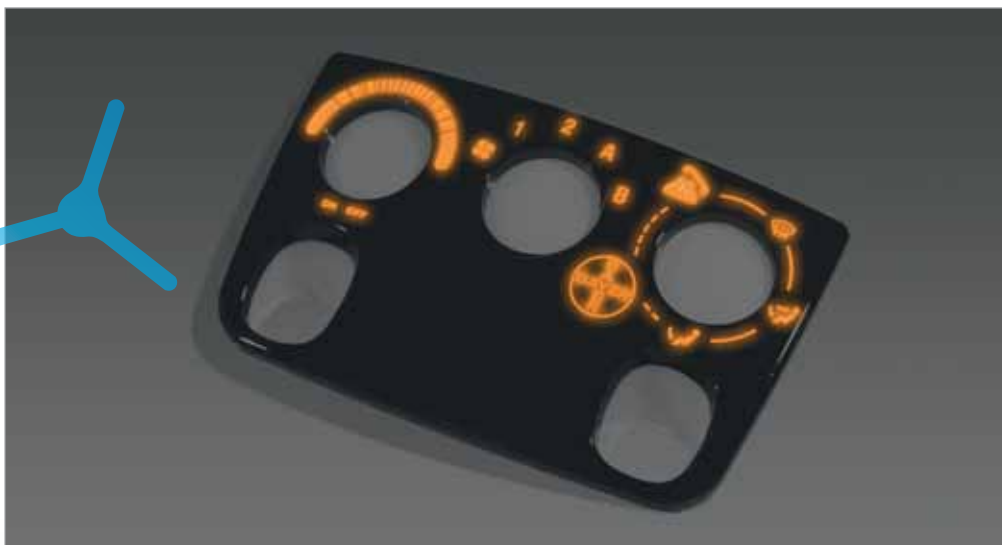
- + Enabling even longer service life of PC documents
- + Scratch and chemical resistant
- + Enables high-contrast laser engraving
- + Accurate engraving transfer from lamination plate to the film
- + Same processing parameters as standard Makrofol® ID films



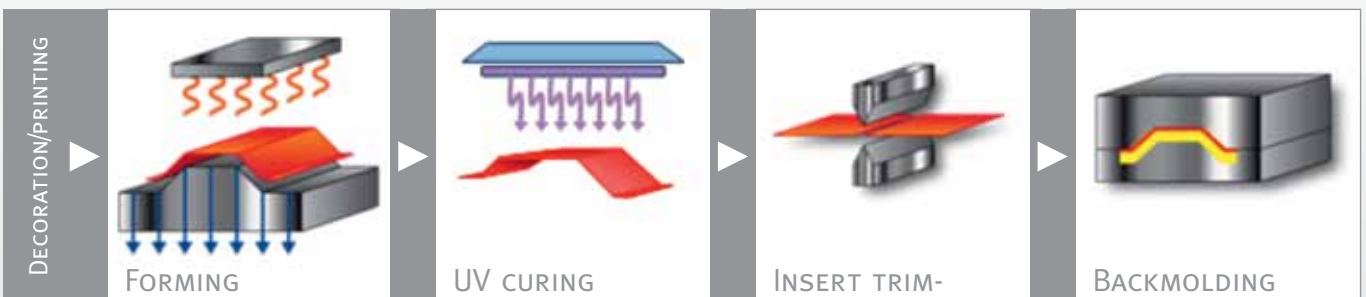
## Formable hardcoated films for interior applications

**Makrofol®**, formable hardcoated films **Makrofol®** hardcoat formable **Makrofol® HF278**: processing under normal light conditions

- + Very good formability, enables small radii and sharp corners
- + Suitable for high-pressure forming and thermoforming
- + Very good chemical resistance
- + Very high abrasion resistance
- + Superior performance due to UV curing
- + High gloss level (like black piano effect)



Film insert molding process with formable hardcoated films:

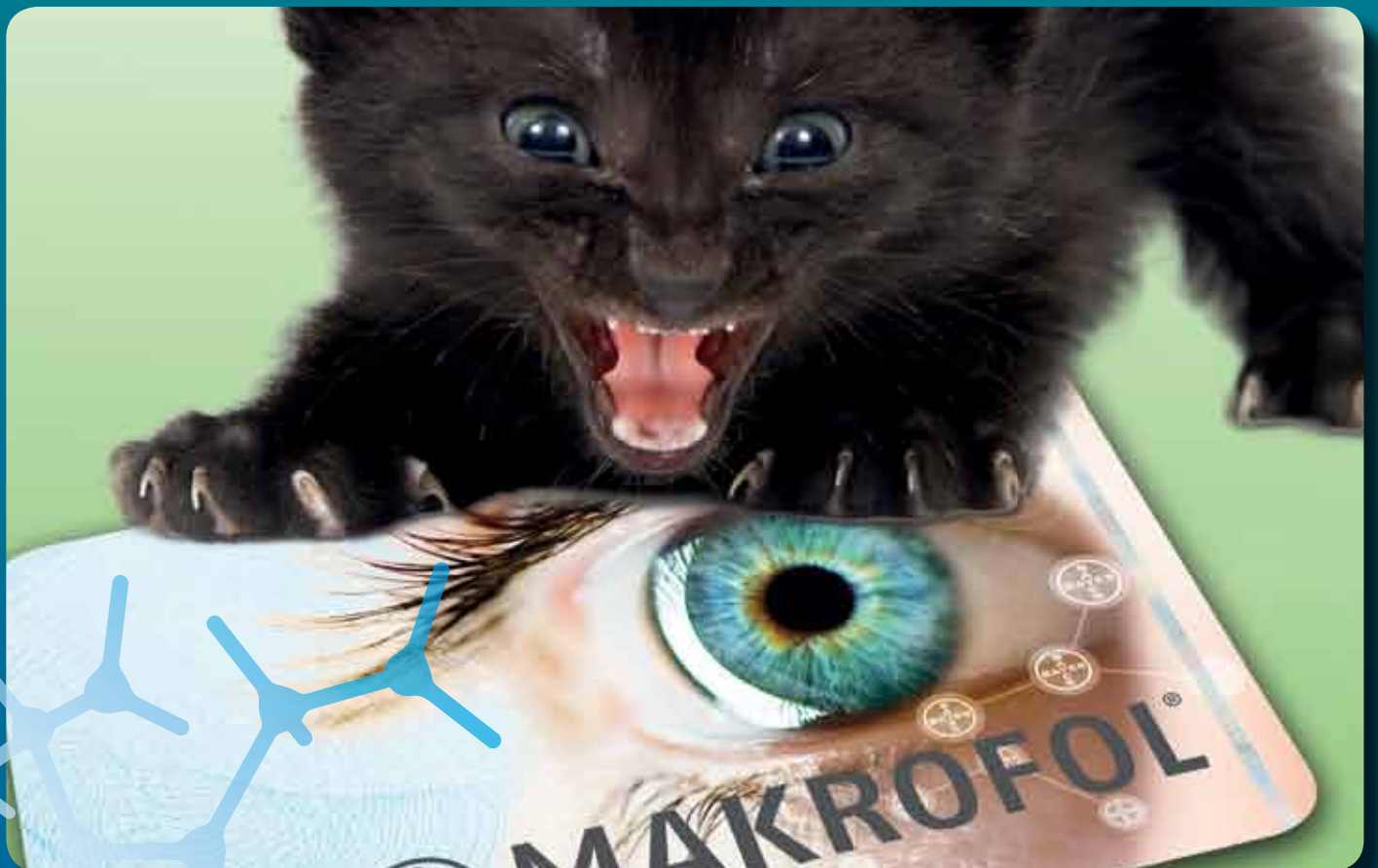


## Formable scratch resistant films without UV curing

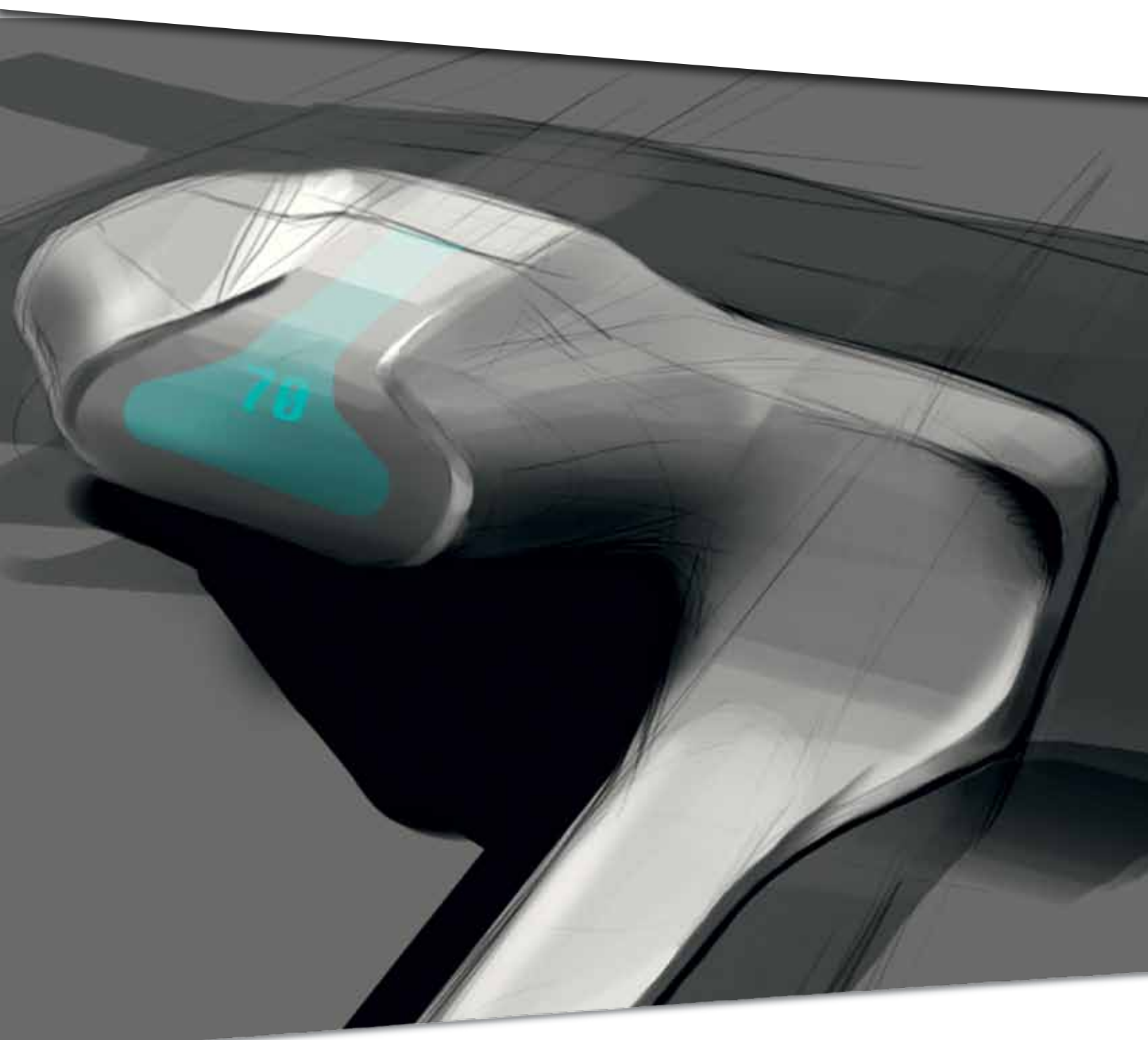
### Makrofol® SR253

- + Very good formability, easy processing
- + Good chemical resistance
- + Improved abrasion resistance
- + UV-protected
- + High gloss level (like black piano effect)
- + Coextruded film, combines impact performance of polycarbonate with abrasion resistance









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