

## HIGH-PERFORMANCE LEATHER FINISHING FOR NATURAL APPEARANCE

### Leather, a product of nature

Clothes, shoes, bags, furniture or leather seat covers are popular, as leather feels good, is naturally breathable, cuddly and conveys a warm feeling. In addition, it should also be abrasion-resistant, scratch-resistant, light-weight as well as dirt-, oil- and water-repellent. To meet these expectations, the natural properties of leather have to be supplemented by surface treatments and protective coatings.

### ORMOCER® for creative products

ORMOCER® systems developed at Fraunhofer ISC are hybrid polymers made of inorganic and organic network components, which can be varied and adapted in manifold ways. This versatility makes the functional matrix suitable for the most diverse challenges. By stable chemical bonds within the hybrid polymers the migration of monomers can be completely prevented.

### ORMOCER® makes the leather high-performance

For leather, the Fraunhofer ISC has developed ORMOCER® finishes which, in particular, aim at excellent property improvements without changing the visual appearance and haptics that are so important to the consumer. Since ORMOCER® finishes are only applied in extremely thin layers of 4 micrometers, the natural structure and haptics are preserved, but nevertheless the desired robustness against scratches, abrasion, soiling, etc. is ensured.

### Leather – naturally powerful

ORMOCER® leather coating finishes optimize the performance characteristics with less material use and offer the following properties:

- Distinct hydrophobicity with a correspondingly high water vapor permeability
- Very good scratch resistance, fastness to rubbing and improved wear resistance
- Good heat resistance
- Good light fastness and UV stability
- Exceptionally good and durable adhesion to leather
- Excellent stability of ORMOCER® leather coatings
- Very good preservation of natural haptics and appearance

In addition, the ORMOCER® leather coating can decisively contribute to the reduction of outgassing from the leather itself.



Picture: Angelina Litvin, unsplash.com



Picture: Sean DuBois, unsplash.com

### Our offer

- Consulting and concept development
- Feasibility studies
- Implementation of new concepts for the functionalization of surfaces
- Materials development
- Characterization of materials and surfaces
- Analytics
- Process development on own pilot plants
- Technology transfer and support in implementation in the industrial process
- Improvement of existing procedures
- Licensing

Parameters	State of the art	ORMOCER® coating	Requirements
<b>Adhesive strength</b> (IUF 470) [N/cm]	> 4.0	<b>9.0</b>	> 1.5 (furniture) > 4.0 (automobiles)
<b>Rub fastness of top side</b> (DIN EN ISO 11640)			
<b>dry felt:</b> 500 cycles	4	<b>5</b>	> 4
<b>wet felt:</b> 80 cycles	4	<b>5</b>	> 4
<b>felt pH 8,0:</b> 50 cycles	4	<b>5</b>	> 4
<b>Grey scale grade 5 - 1*</b>			
<b>Abrasion resistance</b>			
(according to DIN 53109) number of abrasion cycles with abrasion wheel CS 10 and load of 10 N	visible abrasion after 10-20 abrasion cycles (furniture)	<b>slightly visible abrasion after 60 cycles</b>	no visible abrasion after 500 cycles (only for automobiles)
<b>Fastness to water spotting</b> (IUF 420)			
<b>absorption time</b> (min)	10 -15	<b>36</b>	> 10
<b>change of color</b>	4 - 5	<b>5</b>	5
<b>Grey scale grade 5 - 1*</b>			

Parameters	State of the art	ORMOCER® coating	Requirements
<b>Water vapor permeability</b> (DIN 53333) [mg/cm <sup>2</sup> h]	0.8 - 1.5	<b>9</b>	> 1.5 (auto- mobiles) 2.0 (furniture)
<b>Water vapor absorption</b> (DIN EN 344) [mg/cm <sup>2</sup> ] during 8 h	4.6 - 5.8	<b>21</b>	8.0 (furniture)
<b>Emission</b> (VDA 277) [µgC/g]	300 - 1000	<b>113 - 223</b>	< 100
<b>Fogging</b> (VDA 75201) [mg/50 cm <sup>2</sup> ]	5-10	<b>3 - 4</b>	< 5 (auto- mobiles)
<b>Thermal stability</b> (TL 52064)	> 3 - 4	<b>&gt; 3 - 4</b>	> 3 - 4 (auto- mobiles)
<b>Grey scale grade 5 - 1*</b>			
<b>Light stability</b> (DIN 54004)	5 - 6	<b>5 - 6</b>	5
<b>Blue scale grade 6 - 1**</b>			

\*5 (best) -1 (worst)  
\*\*6 (best) -1 (worst)