

BARRIER COATING ON 3D SHAPED CONTAINER

Good barrier properties are of particular importance especially in food and pharmaceutical packaging applications. They allow to extend to product shelf life by limiting contact with oxidizing agent such as H₂O and O₂.

CPI was able to highly improve barrier properties of polymeric substrates by depositing high quality coating using vacuum plasma. This coating contains only 2 layers but still shows excellent Oxygen transmission rate (OTR) and Water transmission rate (WTR) results.

The coating was first deposited on PET and PP films. To optimize the chemistry parameters before depositing the same coating on 3D containers.

The measured OTR and WTR values of the films are given in Table 1.

Tab. 1
OTR and WTR values for treated films

Substrate	Recipe	OTR1	OTR2	OTR before treatment	WTR1	WTR2	WTR before treatment
PET 12 µm	1	0.7	0.4	110	0.21	0.22	35
PP 20 µm	2	11.2	9.6	1800	0.11	0.09	9

The calculated Barrier Improvement Factor (BIF) are given in the following table

Tab. 2
Calculated BIF factors for the treated films

	BIF O ₂	BIF H ₂ O
Testing Conditions	23°C – 50%RH	38°C – 90%RH
PET 12 µm	288	187
PP 20 µm	192	97

After having validated the optimal treatment parameters for the targeted application, the coating was deposited onto a polypropylene (PP) container.

The calculated BIF for O₂ on th container was superior to 100.

As shown by the calculated BIF value, CPI was able to successfully improve barrier properties on 3D shaped PP substrate with a relatively simple process (only 2 layer).

Fig. 1
Schematic of the layer arrangement on the container. The coating was deposited both inside and outside of the container.

