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## **Long-time Performance of Bottles Made of PET Blended with Various Concentrations of Oxygen Scavenger Additive Stored at Different Temperatures**

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### **Abstract:**

Blending of poly(ethylene terephthalate) (PET) with oxygen scavenger additives is a way to reduce ingress of oxygen into PET bottles made of these blends. The objective is to reduce oxidation of packaged beverages and oils. However, few studies were performed about the long-time influence of temperature on PET bottles with oxygen scavenger additives. Such knowledge is relevant for the development of accelerated tests. In this study, the influence of temperature on oxygen permeation of PET bottles with the oxygen scavenger additives MXD6 or Oxyclear<sup>®</sup> was examined. PET bottles made of blends of PET with 2, 5 and 8 wt.-% MXD6, respectively, or with 2 wt.-% Oxyclear<sup>®</sup> were filled with deoxygenated water. The bottles were stored at 5, 23, 38, and 55 °C up to 5 years. Oxygen partial pressure of the water in the bottles was measured regularly. As expected, oxygen partial pressure increased earlier at higher temperatures because of faster exhaustion of the oxygen scavenger. Oxygen partial pressure of water in PET bottles with 8 wt.-% MXD6 was below 10 mbar even after 5 years storage time at 5 and 23 °C. Oxygen absorption capacity of activated MXD6 was at least 76 mg/g. This study shows that PET bottles with oxygen scavengers are able to reduce the oxygen ingress for several years, even at elevated temperatures.

Keywords: oxygen scavenger, active barrier, PET bottles, MXD6