

## **The effect of different peroxide on LDPE foam properties in the presence of polyfunctional monomers**

### **Abstract**

The crosslinking promotion effect of different peroxide decomposition temperatures in the formation of crosslinked low density polyethylene/ polyfunctional monomers (LDPE)/(PFM) foam was investigated. Two peroxides, namely Dicumyl Peroxide (DCP) and 2,5-Dimethyl-2,5-di(tert-butylperoxy) hexyne-3 (T145), were compared. This was conducted to establish a base performance for the T145 and would essentially open new grounds for work for higher temperatures crosslinking materials. From this work the results indicate that at similar peroxide concentrations, T145 gave a higher crosslinking level than DCP. Comparisons between DCP and T145 indicated that similar gel content was achieved by taking into account molar masses and radicals generated per peroxide molecule. It was determined that the curing cycle time of DCP alone could be reduced by approximately 67% by increasing the curing temperature from 165°C to 185°C. Polyfunctional monomers containing allylic groups, which can generate allylic and alkyl radicals, appeared to be significantly more effective than methacrylates, which generate only alkyl radicals. Foaming behaviour can be predicted from the swell ratio obtained from testing solid crosslinked polymers while the more traditional predictive parameters, gel content and melt modulus, are not universally applicable. Irrespective of peroxide, curing temperature and polyfunctional monomer type and concentration, foam density is shown to be a function of swell ratio. Independent of the type of peroxide, crosslinking promotion was shown to be in the order of TAC > DALP > TMPTMA where the latter actually suppressed crosslinking at higher peroxide concentrations.