EVALUATION OF SUITABILITY OF 1,4-DIMETHYLPIPERAZINE AS A SUBSTITUTE CATALYST FOR POLYURETHANE FOAM PRODUCTION

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Declaration

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Abstract

The flexible polyurethane foams have been fabricated from polymeric 4,4'-di-phenylmethane diisocyanate (MDI) and polyols. Catalysts play a major role in polyurethane foam preparation controlling the reaction profile throughout the reaction time. As a substitute catalyst 1,4-dimethylpiperazine promotes gelling reaction as well as blowing reaction as predicted. Effect of 1,4-dimethylpiperazine on polyurethane foam formation was investigated by varying the additive concentration while keeping all the other factors constant. Sample of standard dimensions were prepared from the resultant foam. They were used for density test compression set test, tensile strength and elongation tests. The tests were carried out as per the ASTM -D3574 standards. The reaction profile has moved to slower direction in terms of gelling time, rise time, curing time in the presence of 1,4-dimethylpiperazine compared to the control catalyst. This is due to the less reactivity of the test catalyst. The resultant controlled behavior of the 1,4- dimethylpiperazine could be more useful in applications such as complex molding. Other physical properties such as foam density, hardness, tensile strength, compression set test value lie within the comparable range which could again be useful in molding conditions. It is concluded that 1,4-dimethylpiperazine is a good delayed action catalyst which is found to be better for in-mold flowability and slow cure times with comparable foam properties.

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List of Abbreviations

Abbreviation	Description
1,4-DMP	1,4-dimethylpiperazine
Mol wt	Molecular weight
MDI	Diphhenyl methane diisocyanate
TDI	Toluenediisocyanate
HDI	Hexamethlyene diisocyanate