# LAMINATED PALM-BASED POLYURETHANE SHEET

by: MOHD NORHISHAM, S; HAZIMAH, A H; OOI, T L and SALMIAH, A

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Over the last 10 years, MPOB, through its Advanced Oleochemical Technology Division, has put in much efforts to produce new palm-based polyols. The current MPOB palm oil polyol (POP), which can now be produced in pilot plant scale, can be formulated into various polyurethane (PU) foams rigid, semi-rigid and flexible for use in the building, furniture and automotive industries. Currently, MPOB is developing a new class of PU-laminated palm-based PU sheet.

## LAMINATED PALM-BASED POLYURETHANE SHEET

This project is the process for preparation of PU sheet and PU sheet laminated with some suitable materials. The PU sheet was prepared by blending palm-based polyol and the additives with the use of a stirrer. The isocyanate was then added to the blended polyol. The mixture was stirred for 20 s and the blended polyol poured onto a spreader and spread using an automatic film applicator. At the tack-free stage, the laminate materials were bound and pressed evenly onto PU sheets. The laminated PU sheet produced was allowed to cure for three days before analysing for its properties. According to ASTM-D638. In the study, a few laminating materials were used: gauze, aluminum paper, aluminum plastic and polyethylene plastic *(Figures 1* to *3).*

The properties of the polyols used to formulate the laminated palm-based PU sheet and the properties of the products are shown in *Tables 1* and *2*.

## POTENTIAL APPLICATIONS

The potential applications of palm-based PU sheets are as fabrics for automobile seats, cushions and furniture. They can also be used as table cloth.

*Figure 1. Polyurethane sheet without lamination material.*

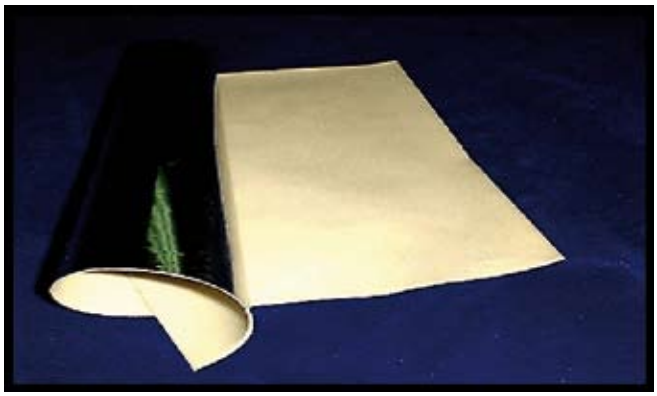

*Figure 2. Polyurethane sheet laminated with aluminum plastic.*

*Figure 3. Polyurethane sheet laminated with gauze.*

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Malaysian Palm Oil Board, Ministry of Plantation Industries and Commodities, Malaysia
P. O. Box 10620, 50720 Kuala Lumpur, Malaysia. *Tel*: 03-87694400 *Website*: http://mpob.gov.my *Telefax*: 03-89259446

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**TABLE 1. PROPERTIES OF POLYOL USED IN THE FORMULATION**

| | OHV, mg KOH $g^{-1}$ | Acid value, mg KOH $g^{-1}$ | Molecular weight, g $mole^{-1}$ |
|---|---|---|---|
| Palm based polyol | 136 | 0.8 | <1000 |

Note: OHV = hydroxyl value.

**TABLE 2. PHYSICAL PROPERTIES OF PALM-BASED POLYURETHANE SHEET, LAMINATED PALM-BASED POLYURETHANE SHEET AND A COMMERCIAL SHEET**

| | Tensile strength, MPa | Elongation at break, % |
|---|---|---|
| Palm-based polyurethane sheet | 1.3 | 124.1 |
| Laminated palm-based polyurethane sheet (with gauze) | 4.0 | 20.2 |
| Commercial automotive fabric (PVC sheet) | 4.5 | 387.7 |

## CONCLUSION

A new class of PU products as sheet was developed using palm-based polyol.

For more information kindly contact:

Director-General
MPOB
P. O. Box 10620
50720 Kuala Lumpur, Malaysia.
*Tel*: 03-87694400
*Website*: http://mpob.gov.my
*Telefax*: 03-89259446