

# SOUND DEADENERS ASPHALTIC MELT PADS (damping sheet) FROM OIL PALM FIBRES FOR THE AUTOMOTIVE INDUSTRY

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The palm oil industry generates vast amounts of biomass from its mills and plantations. Although some are used, most are largely wasted, particularly empty fruit bunches (EFB). EFB can be treated and used to make automotive parts. One such application is the production of damping sheets.

Damping sheets are used to reduce noise, vibration and harshness (NVH) in automobiles by absorbing the vibration and noise caused by the car. Damping sheets are normally placed in certain parts of the vehicle such as on the floor and in the doors and trunk, fussed permanently in place by heat as shown in *Figure 1*.

Damping sheets are normally made by melting one or more binders, natural/synthetic rubber and/or various synthetic resins. Fillers such as asbestos and calcium carbonate are mixed with the binder before rolling the mixture into sheets which are then cut into the desired shapes.

MPOB has produced a damping sheet by substituting the asbestos, silica, recycled paper and resins with oil palm fibre and different resins. Although asbestos/silica in commercial damping sheet confers better tensile strength and rigidity, it is not good for health and also the cost of production. Oil palm fibre is a cheaper and more environment-friendly material, with no compromise to the commercial properties of the sheets.

Malaysia is an attractive market for passenger cars with more than 500 000 cars sold annually, largely locally produced/assembled. There is, therefore, good potential to produce damping sheets locally. It is estimated that at least 10 kg damping sheets are required for a car and with about 400 000 cars produced/assembled locally and at 30% market share, there is a market for 1.2 million kilogramme damping sheets annually. With a least 20% oil palm fibre in the damping sheets, 240 t of palm fibre would be required annually. With the materials



Figure 1.

cost of palm-based damping sheet at RM 0.80 kg<sup>-1</sup>, and an average sheet selling at an estimated RM 2.20 (profit, transportation and packaging), the product can generate more than RM 2.64 million annually (RM 2.20 x 10 kg car<sup>-1</sup> x 120 000 cars).

## BENEFITS OF COMMERCIALIZING THE OIL PALM DAMPING SHEET

- Adding value to an otherwise unused oil palm waste; and
- Cheaper and more environment-friendly material (free from asbestos and easily degradable).

## ADVANTAGES OF OIL PALM DAMPING SHEET

- Low cost from abundant raw material;
- Environment-friendly (asbestos-free);
- Light weight (low density <1.0 SG);
- Thinner than present sheets with comparable damping capacity (loss factor);
- Excellent physical and mechanical properties (*Table 1* on sound deadeners - meets ES-X62223/6 specifications) e.g. shrinkage, ash content, loss on heating, heat fluidity, impact resistance, heat deflection, heat adhesion, odour, surface tack and deformation, smoke temperature, corrosion and damping resistance.

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**TABLE 1. TEST RESULTS OF OIL PALM DAMPING SHEET**

<b>Oil palm loading (%)</b>	<b>Test Method (ES-X 62223/6)</b>	<b>Results</b>	<b>Note</b>
5% to 30 %	Shrinkage (<2%)	1.25	Comply
	Ash content (<60%)	42	Comply
	Loss on heating (<0.6%)	0.3	Comply
	Heat fluidity (<10 mm)	5	Comply
	Impact resistance (at 5°C and 20°C > 35 cm high)	No crack	Comply
	Heat deflection (<10 mm)	5.84	Comply
	Heat adhesion (>50%)	68	Comply
	Odour (no excessive stink)	Level 4	Comply
	Surface tack and deformation	No crack	Comply
	Smoke temperature (>160°C)	161	Comply
	Corrosion test	Nil	Comply
	Damping resistance (>0.05)	0.095	Comply

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