

# LNP™ FARADEx™

## COMPOUND USED IN EMI SHIELDED PCB ENCLOSURES PRODUCT ENVIRONMENTAL SUMMARY

FARADEx compound is an excellent candidate material for replacing aluminum and conductive painted PC/ABS resins in electromagnetic interference (EMI) shielded printed circuit board (PCB) enclosures while reducing weight, greenhouse gas (GHG) and energy footprints, and system cost.

### KEY BENEFITS\*

- 50% weight reduction vs. aluminum
- Simpler manufacturing process
- 21% lower GHG and 38% lower energy footprints vs. PC/ABS over life cycle
- 47% lower GHG and 46% lower energy footprints vs. diecast aluminum over life cycle
- EU RoHS, JIG, EU Ecolabel, TCO, Blue Angel, Nordic Swan compliant
- No REACH Substances of Very High Concern, IEC 'halogen-free'

\*see next page for full details

### POTENTIAL APPLICATIONS

- Electrical & Electronics
- Automotive
- Industrial
- Telecom infrastructure
- Business equipment

Making 200,000 PCB enclosures with FARADEx compound instead of conductive painted PC/ABS resin could:<sup>1</sup>

- Avoid emitting as much GHG as would be absorbed in a year by a UK forest the size of 110 soccer fields<sup>2</sup>
- Save enough energy to power 700 European homes for a year<sup>3</sup>

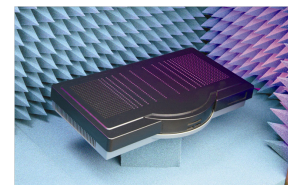
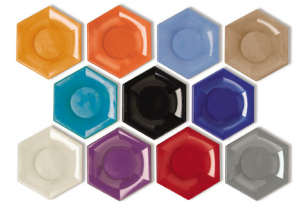


FIGURE 1: LIFE CYCLE GHG AND ENERGY FOOTPRINT: COMPARED TO ALUMINUM<sup>4,5</sup>

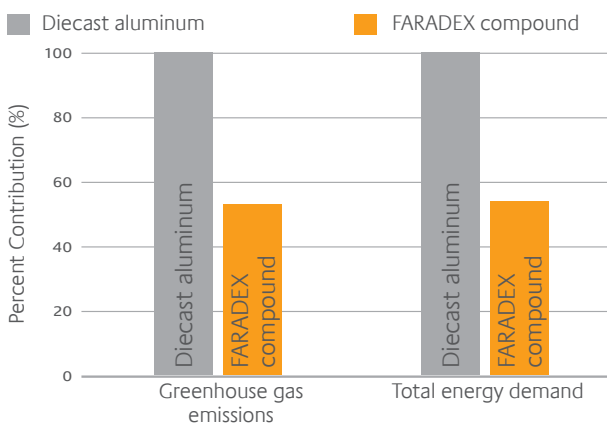
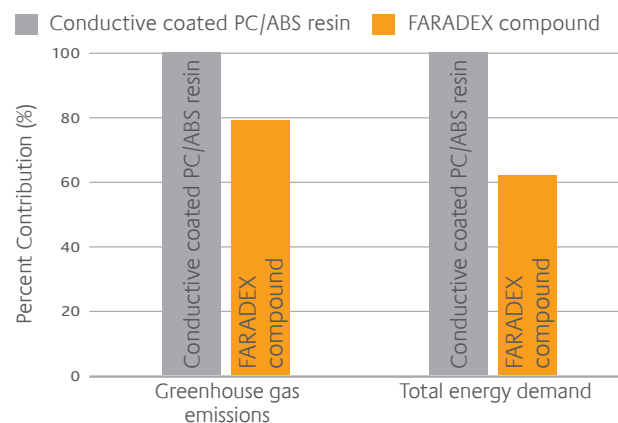


FIGURE 2: LIFE CYCLE GHG AND ENERGY FOOTPRINT: COMPARED TO PC/ABS RESIN<sup>4,6</sup>



# LNP FARADEx COMPOUND PRODUCT ENVIRONMENTAL SUMMARY

**APPLICABILITY:** The following is applicable to FARADEx compound for EMI shielded PCB enclosures.<sup>1</sup>

## LOWER COSTS<sup>1</sup>

FARADEx compound is capable of meeting electronics compatibility regulations and part design requirements, while reducing the overall weight by up to 50% compared to aluminum alloys used in typical automotive electronics enclosure applications. FARADEx compound's lower mass and system costs may contribute to total cost savings.

## LOWER GHG AND ENERGY FOOTPRINTS<sup>1, 4</sup>

On a component basis, FARADEx compound has significantly lower GHG and energy footprints compared to both conductive painted PC/ABS resins and aluminum alloy from material sourcing through the end of the product life.

A PCB enclosure made from FARADEx compound has:

- A life cycle GHG footprint of 4 kg, vs. 5.1 kg for one made from conductive painted PC/ABS resin, a 21% reduction, and 7.6 kg for one made from aluminum alloy, a 47% reduction.
- A life cycle energy footprint of 72 MJ, vs. 116 MJ for one made from conductive painted PC/ABS resin, a 38% reduction, and 135 MJ for one made from aluminum alloy, a 45% reduction.

## PROCESS ELIMINATION

FARADEx compound delivers similar performance without the need of a secondary, conductive painting process, which is required when using a standard PC/ABS resin. This eliminates associated volatile organic compound (VOC) emissions and permit fees, and increases overall productivity.

## CLEANER CHEMISTRY

FARADEx compound is designed to comply with the RoHS Directive (2002/95/EC), the Joint Industry Guide (JIG) and the IEC 'halogen-free' standard (IEC 61249-2-21), eco-labels such as EU Ecolabel, TCO, Blue Angel, Nordic Swan. Its formulation does not include any of the Substances of Very High Concern as specified under the REACH Regulation (EC 1907/2006) as verified on Oct 31, 2012.

## VERIFIED ENVIRONMENTAL PERFORMANCE

SABIC partners with GreenOrder, a leading sustainability consulting firm, to provide third-party technical analysis and verification of Sustainability Solutions benefit claims.



## REFERENCES

1) Based on 1,144 cm<sup>2</sup> surface area enclosure. Typical thickness and density vary by material. FARADEx: thickness = 2.5 mm, density = 1.29 g/cm<sup>3</sup>; Conductive coated PC/ABS: thickness = 2.5 mm, density = 1.17 g/cm<sup>3</sup>; Diecast aluminum: thickness 3.0 mm, density = 2.7 g/cm<sup>3</sup>. Cases different from these may vary; please contact us to discuss your applications.

2) Average CO<sub>2</sub> emissions absorbed by 1 hectare of UK forest is equal to 3,800 kg, Source: Cannell et al., Climate Change, Vol. 42, Number 3, pp 505-530, 1999.

3) Average residential power usage in the EU (5/2012) is equal to 3,500 kWh/year, www.energy.eu - Europe's Energy Portal. Gas & Electricity: Domestic.

4) Scope of this LCA study includes raw material extraction, manufacturing, fabrication, use, and end of life stages and is performed based on ISO14040/44 framework. The functional unit used in this study is one PCB enclosure.

5) Based on Ecoinvent database.

6) PC/ABS life cycle data was taken from EcoProfiles of the European Plastics Industry, www.plasticseurope.org/plastics-sustainability/eco-profiles.

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