




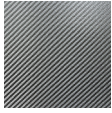


JSP is committed to reducing its carbon footprint by optimising processes to reduce the environmental impact of the production and use of ARPRO.

Since 2012, we have reduced CO₂ emissions during production by 34%. In addition, JSP continues to reduce the carbon footprint of cars and other applications by decreasing their Global Warming Potential. Using ARPRO in cars reduces weight and the amount of CO₂ released into the environment. For example when a conventional rear seat-core is replaced by ARPRO a 35% reduction of CO₂ is achieved.

| Global Warming Potential of 1kg of ... | |
|--|--|
|  <p>Polypropylene¹ 1.63kg CO₂(e)</p> | <p>With 68 million tons² consumed in 2015, it is the most used polymer globally. A polyolefin derivative from crude oil through polymerisation. The main ingredient in the production of ARPRO.</p> |
|  <p>ARPRO 2.78kg CO₂(e)</p> | <p>Used in automotive, HVAC and packaging. An engineered high compression strength, lightweight closed-cell-bead foam that delivers energy absorption with structural strength, as well as providing chemical resistance, thermal and acoustic insulation. 100% recyclable. Isotropic. Can be fire retardant. Can withstand multiple impacts. 55% of the CO₂(e) released from the manufacturing of ARPRO results from the production of the raw material.</p> |
|  <p>Expanded polystyrene¹ 2.37kg CO₂(e)</p> | <p>The global sales revenue in 2015 was approximately €11.7 billion³. Used for protection and insulation. Recycling in some countries is difficult and disposal very expensive. A closed-cell-bead foam using organic hydrocarbons as blowing agents. Used for single impact protection⁴.</p> |
|  <p>Polyurethane foam¹ 3.22kg CO₂(e)</p> | <p>27 million tons² consumed globally in 2015 in automotive, mattresses and thermal insulation. A thermoset foam available in many variations. Recycling is very difficult.</p> |
|  <p>Aluminium⁵ 6.7kg CO₂(e)</p> | <p>Used in many industries including cans, foils, and aerospace with 270 million tons used in 2015⁶. Lightweight, corrosion resistant. Density is one-third of steel or copper⁶ and 50 times higher than medium density ARPRO used in a door panel or bumper core.</p> |
|  <p>Carbon fibre⁷ 20kg CO₂(e)</p> | <p>High tech material used in aerospace, civil engineering, military and motorsports with 83 million tons consumed in 2015⁸. High stiffness, high tensile strength and low weight. It is wasteful to produce and difficult to recycle. Carbon fibre costs 10 times more than aluminium⁹.</p> |

Car CO₂(e) emissions



Electric car¹⁰
0 CO₂g/km*



Small class petrol¹¹
92 CO₂g/km



Medium class petrol¹²
116 CO₂g/km



Upper class diesel¹³
243 CO₂g/km

* If electricity is from a renewable source

Version 1

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Interesting facts

How much CO₂(e) does the production of 1kg of the following release; from cradle-to-gate¹⁴.



Chicken
3kg CO₂(e)



Greenhouse vegetables
5kg CO₂(e)



Beef
15kg CO₂(e)



Butter
24kg CO₂(e)

Summary

ARPRO is 100% recyclable.

JSP is the only manufacturer of expanded polypropylene that offers a grade made with recycled content. ARPRO 5135 RE has 15% recycled content. This content originates from end of life products that are collected and processed back into ARPRO. The recycled ARPRO has the same physical performance as virgin material and we are developing new products with a higher percentage of recycled content to meet future legislations.

The ARPRO Life Cycle Assessment (LCA) proves ARPRO has a quantifiable and significant environmental benefit of twelve times its impact, most of which can be attributed to weight savings and reducing fuel consumption.

Key facts from the ARPRO LCA:

- Calculating a comparative global warming potential for an ARPRO seat-core shows an **environmental benefit to impact ratio of 12:1**:
 - The impact of the seat-core was equal to 21.9kg CO₂(e)
 - The resultant fuel saving equated to 265kg CO₂(e)
- If this saving is applied to the number of cars sold annually, an environmental **saving of nearly 16 million tonnes of CO₂(e)** could be achieved.
- CO₂(e) savings are the result of the ability to deliver component weight reduction of 35% by replacing other conventional material.
- As ARPRO is fully recyclable, so there is further potential to reduce its environmental impact which was not considered in this LCA.

For more information please visit ARPRO.com or call +44 13 44 89 48 00.

Definitions

Global Warming Potentials (GWPs) are used to estimate, compare and aggregate the relative climate effects of various greenhouse gases (GHGs). They are a measure of the relative radiative effect of a given substance compared to another, integrated over a chosen time horizon¹⁵.

CO₂(e) stands for the unit based on the global warming potential of different greenhouse gases¹⁶. The CO₂(e) unit measures the environmental impact of one tonne of these greenhouse gasses in comparison to the impact of one tonne of CO₂.

Sources

- 1 <https://www.plasticseurope.org/en/resources/eco-profiles>
- 2 <https://theconversation.com/the-world-of-plastics-in-numbers-100291>
- 3 <https://www.prnewswire.com/news-releases/expanded-polystyrene-white-eps--grey-eps-market-2015---global-forecast-to-2020-for-the-17-billion-industry-300176951.html>
- 4 [https://en.wikipedia.org/wiki/Polystyrene#Expanded_polystyrene_\(EPS\)](https://en.wikipedia.org/wiki/Polystyrene#Expanded_polystyrene_(EPS))
- 5 <https://pubs.usgs.gov/of/2010/1256/pdf/ofr2010-1256.pdf>
- 6 <https://european-aluminium.eu/media/2052/european-aluminium-environmental-profile-report-2018-executive-summary.pdf>
- 7 http://www.torayca.com/en/aboutus/abo_003.html
- 8 <https://www.nrel.gov/docs/fy17osti/66875.pdf>
- 9 <https://www.theguardian.com/sustainable-business/2017/mar/22/carbon-fibre-wonder-material-dirty-secret>
- 10 <https://www.kia.com/uk/new-cars/soul-ev/emissions/>
- 11 https://www.audi.co.uk/content/dam/audi/production/RestOfSite/FleetSales/Redesign2012/PDF/FleetManager/Useful_Information_for_Fleet_Managers/Green_Issues/Audi%20CO2%20by%20model.pdf
- 12 https://www.volkswagen.co.uk/assets/common/pdf/vw_below_130_emissions_guide.pdf
- 13 https://www.landrover.co.uk/Images/Specification-And-Price-Guide-1L4051810000GBEN01P_tcm295-427210.pdf
- 14 <https://www.eea.europa.eu/data-and-maps/figures/carbon-material-and-water-footprint>
- 15 <https://unfccc.int/resource/docs/tp/p0403.pdf>
- 16 <https://climatepolicyinfohub.eu/glossary/co2eq>

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