
CARBON FOOTPRINT OF AIRPLANE TROLLEYS

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TNO Built Environment and Geosciences report *(short version of the summary)*

AeroCat has selected the Netherlands Organization for Applied Scientific Research (TNO) as independent Dutch research institute to calculate a life cycle assessment based carbon footprint of AeroCat trolleys and to compare the outcome with the carbon footprint of aluminum trolleys.

In the study data is used that is representative for aluminum trolleys without referring to a specific type. The reference aluminum trolley weighs 21 kg and has a lifetime of 7 years. After the lifetime the salvageable materials are stripped, to compose one second-hand trolley out of three trolleys, with an additional lifetime of 5 years. At the end of the trolley life, the aluminum will be recycled into other aluminum products, thus avoiding the production of primary aluminum.

In the study, full size AeroCat trolleys, made from RADEL polymer weigh 17 kg, and have an estimated lifetime of 10 years. AeroCat trolleys weigh less compared to their aluminum counterparts, thus less kerosene will be used in the use phase. The AeroCat trolley will provide better insulation, thus saving on dry ice, and will be 100% closed loop recycled into new trolleys at the end-of-life. Closed loop RADEL recycling will prevent new virgin RADEL production thus resulting in a CO₂ bonus.

In order to make an impartial comparison between the two types of trolleys, the CO₂ emissions over the life cycle of the trolleys are divided by the lifetime, allowing to compare even though their lifetime is different.

Compared to aluminum trolleys, AeroCat trolleys reduce the carbon footprint by a factor 2.2, not taking into consideration the differences in the use phase as a result of lower weight. The main difference comes from the differences in material production and the CO₂ bonus for the recycling. If the lifetime of AeroCat and aluminum trolleys turns out to be the same, the carbon footprint related to production, maintenance and end-of-life is still a factor 1.9 better for AeroCat trolleys.

The differences in weight and improved insulation capacity have a large effect on the carbon footprint. If 23 trolleys are replaced by AeroCat trolleys that weigh 4 kg less, this would save each year the volume of 1 fuel tanker of jet kerosene. Improved insulation capacity adds an additional CO₂ reduction.

Assuming that 10% of the worldwide installed base of airplane trolleys (estimated 2 million), would be replaced by the AeroCat trolley this would save 310 thousand tons of CO₂ per year, equivalent to the CO₂ emission resulting from the amount of electricity annually needed to light the homes of 1.7 million people.

If saved CO₂ emissions could be traded, with a CO₂ price of €20 per ton, each full size AeroCat trolley saves €41 of CO₂ per year and each half size trolley €21 per year.

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