

Data entry - Train

1 Specification of the vehicle

Initial mass of vehicle - before ligh-weighing (kg)	28000
Energy consumption of vehicle per 100 km	
Litres Diesel	0
Percentage biofuel in gasoline or diesel	0%
primary energy for biofuel in MJ/l	20.1
life cycle GHG emissions for biofuel in kgCO2/l	1.46
Nm3 natural gas or LPG	0
MJ electric energy	700
primary energy for electricity in MJ/MJ	7.83
life cycle GHG emissions for electricity in kgCO2/MJ	0.43
Mass sensitive fuel consumption (%)	80%
Fuel savings (liter/100km/100kg)	0.000
Electricity savings (MJ/100km/100kg)	2.000
Life time driving distance (km)	3,000,000

2 Specification of the Component

Component	subway car	
Mass of component (kg)	Aluminium 6000.00	Steel 8000.00
Portion of the component (%)		
...gained from aluminium sheet w/o continous heat treatment	0%	
...gained from aluminium sheet with continous heat treatment	0%	
...gained from extruded aluminium	100%	
...gained from forgings	0%	0%
...gained from castings	0%	0%
...produced from untreated flat mild steel		0%
...produced from hot-dip galvanized flat mild steel		100%
...produced from untreated long and special steel		0%
...produced from hot-dip galvanized long and special steel		0%
Percentage of indirect mass savings (%)	12%	

3 Production stage

Percentage of generated process scrap from forming and machining	5%	5%
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4 Recycled content of final component

Recycled content	Aluminium 50%	Steel 50%
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4 End-of-life stage

Recycling route	Aluminium Classical Shredding	Steel Classical Shredding
Total recycling rate	90%	90%

Results

1 Component information

Type of component	subway car		
Material option	Aluminium		Steel
Mass of the component (kg)	6000.00		8000.00
Mass difference (kg)		2000.00	
Additional indirect savings		12%	
Total mass savings aluminium vs. Steel (kg)		2240.00	

2 Car information

Initial car mass - before light-weighting (kg)	28000
Life time driving distance (km)	3,000,000
Average fuel consumption (l/100km)	0
Average electricity consumption (MJ/100km)	700

Fraction of fuel consumption sensitive to the car mass (%)	80%
Fuel savings (litres/100km/100kg)	0.000
Electricity savings (MJ/100km/100kg)	2.000

3 Recycling Information

Material option	Aluminium		Steel
Recycled content of component	50%		50%
End-of-life recycling rate of component	90%		90%
Credits for end-of-life recycling	40%		40%

4 Non-renewable primary energy for the full life cycle of the component (MJ)

	Aluminium	Steel	Indirect weight equivalent	Savings (incl. use stage)	Relative savings per kg Al (incl. use stage)
Primary metal supply	417,778	101,200	3,036	313,542	
Recycled metal supply	27,055	28,299	849	-2,092	
From ingot to finished product	117,294	95,738	557	20,999	
Use stage	Na	NA	NA	-10,523,520	-1,754
Total (cradle to gate)	562,128	225,237	4,442	-10,191,071	-1,699
Credits for end-of-life recycling	-312,774	-58,686	-1,761	-252,328	
Total (life cycle)	249,353	166,551	2,682	-10,443,399	-1,741

5 GHG emissions (carbon footprint) for the full life cycle of the component (kg CO2-equiv.)

	Aluminium	Steel	Indirect weight equivalent	Savings (incl. use stage)	Relative savings per kg Al (incl. use stage)
Primary metal supply	31,035	8,084	243	22,708	
Recycled metal supply	1,809	1,766	53	-10	
From ingot to finished product	6,142	6,540	44	-442	
Use stage	NA	NA	NA	-577,920	-96
Total (cradle to gate)	38,985	16,389	340	-555,664	-93
Credits for end-of-life recycling	-23,395	-5,086	-153	-18,156	
Total (life cycle)	15,591	11,303	187	-573,820	-96