

Maintenance parts & Consumables

12/01/2024

What to consider ?

Maintenance can be divided into two types :

- 📦 ▪ **Consumables:** Consumable during the use phase of the vehicle. The minimum items to consider are: engine oil, oil filters, 12V battery, engine coolant and traction battery, air conditioning gas etc.
- 🔧 ▪ **Wear parts:** Replacement of **wear parts** (such as tires or brake linings), whose renewal depends heavily on the driver's driving mode. The minimum elements to considered are: tires, brake linings and windscreen wipers etc.

Maintenance parts: Green NCAP

Table 10 GHG emissions and primary energy demand from the maintenance in the whole lifetime of the vehicle (HEV like ICE)

Tires, oil, spare parts	2021			2030			2050		
	GHG [kgCO ₂ eq]	PED [kWh]	PED _{fos} [kWh]	GHG [kgCO ₂ eq]	PED [kWh]	PED _{fos} [kWh]	GHG [kgCO ₂ eq]	PED [kWh]	PED _{fos} [kWh]
Petrol ICE	1,880	6,070	5,700	1,850	6,040	5,590	1,830	6,010	5,510
Diesel ICE	1,870	6,070	5,700	1,840	6,040	5,590	1,820	6,010	5,510
CNG ICE	1,880	6,060	5,690	1,840	6,030	5,580	1,820	6,000	5,500
Petrol PHEV	1,900	6,150	5,770	1,870	6,120	5,660	1,850	6,090	5,580
Diesel PHEV	1,900	6,150	5,780	1,860	6,120	5,660	1,840	6,090	5,580
Electr. BEV	1,800	5,950	5,530	1,760	5,920	5,390	1,730	5,890	5,290
H ₂ HFC	1,800	5,940	5,530	1,760	5,910	5,380	1,730	5,880	5,280

The environmental effects from the maintenance of the vehicle operation are considered, which are tires, spare/replacement parts and engine oil for ICE, HEV and PHEV. Table 10 shows the GHG emissions and PED of the total lifetime mileage of a vehicle coming from the maintenance covering of tires, spare/replacement parts and engine oil.

Fixed values for maintenance part does not reflect the effort from the OEM to reduce carbon footprint of maintenance

Maintenance parts: PFA Guideline

Data related to usage: Service Step

The production and processing of products necessary for the maintenance of the vehicle during its lifetime are included in the scope. The necessary information comes from the recommendations of manufacturers and OEMs. They are partly specified in the vehicle maintenance books.

Maintenance can meet two different needs:

- Maintenance (such as draining): regular maintenance of the vehicle and consumable. The minimum items to consider are: engine oil, oil filters, 12V battery, engine coolant and traction battery, air conditioning gas (*)
- Replacement of wear parts (such as tires or brake linings), whose renewal depends heavily on the driver's driving mode. Reference should be made to the theoretical change frequencies specified in the maintenance book where they exist. The minimum elements to take into account are: tires, brake linings and windscreen wipers.

Suggest to include a list of consumables/replacement parts (not exhaustive list) and mention to use OEM recommendations

Maintenance parts: China

2.2 Inventory Data

■ Description of data usage in each phase of the life cycle

Life Cycle Stage	Data	Source
Material Production	Weight of primary materials	●
	Carbon emission factors of primary materials	●
	Weight of secondary materials	●
	Carbon emission factors of secondary materials	●
	Weight of materials (Primary and secondary)	● ●
	Carbon emission factors of materials (Primary and secondary)	● ●
	Material utility factor	● ●
Vehicle Production	Energy consumption data of vehicle production	●
	Carbon emission factors of fuel production	●
	Carbon emission factors of fuel use	●
	Carbon leakage	●
Vehicle Usage	Fuel consumption	●
	Carbon emission factors of fuel production	●
	Carbon emission factors of fuel use	●
	Tire replacements times	●
	Battery replacements times	● ●
	Liquid replacements times	● ●
Refrigerant escapes times	●	
Life Cycle	Life Cycle Mileage	●

- On-site Data
- Default Data

Note: On-site data and default values can be used in mix.

- ✓ If the default value is used for material weight, only the default value can be used for material carbon emission factor
- ✓ When the material weight uses site-specific data, the material carbon emission factor can use on-site data or default value.

Suggest to include a list of consumables/replacement parts (not exhaustive list) and recommend to use either default values or recommendation from OEM

Present OEM practice

Passenger car example

	M1	Tracks	moto
Oilfilter	○	○	○
air cleaner element	○	○	○
fuel filter	○	○	○
timing belt	○	○	○
spark plug	○	-	○
Disk Pad (Front Wheel)	○	○	○
Brake shoe (rear wheel)	○	○	○
MT Clutch Plate	-	○	-
Regulator	-	○	-
Chain for driving vehicle body side	-	-	○
engine oil	○	○	○
brake fluid	○	○	○
Long Life Coolant	○	○	○
Tires	○	○	○
Auxiliary Battery (Lead Battery)	○	○	○
MT Mission Oil	-	○	-
AT Oil	-	○	-
differential oil	-	○	-

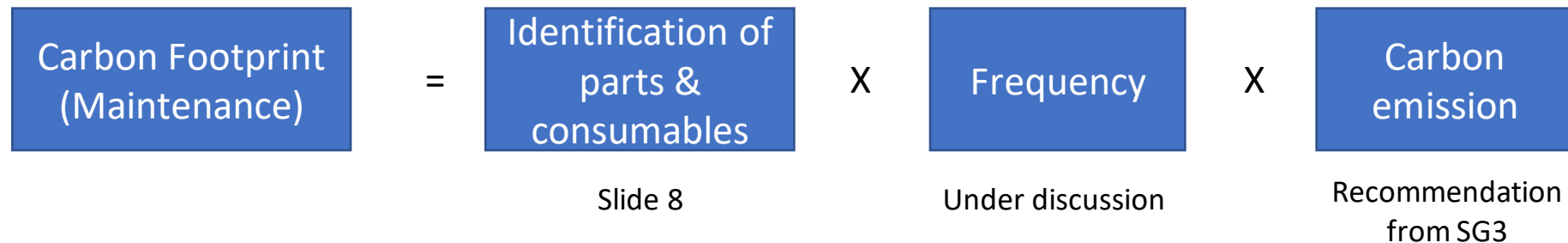


Maintenance Request	BEVs		Gasoline ICEVs		Diesel ICEVs	
	Mileage	Time	Mileage	Time	Mileage	Time
Passenger Air Filter	36,000 km	2 years	36,000 km	2 years	72,000 km	2 years
Electric Drive Unit Fluid	72,000 km	-	-	-	-	-
Hood Lift Support Gas Struts	161,000 km	10 years	161,000 km	10 years	-	-
Body Lift Support Gas Struts	161,000 km	10 years	161,000 km	10 years	-	-
Coolant Circuits	240,000 km	5 years	-	-	-	-
Brake Fluids	-	5 years	-	5 years	156,000 km	5 years
Air Conditioning Desiccant	-	7 years	-	7 years	-	7 years
Engine Filter	-	-	12,000 km	12 months	12,000 km	12 months
Engine Oil	-	-	12,000 km	12 months	12,000 km	12 months
Engine Air Filter	-	-	12,000 km to 24,000 km	-	72,000 km	4 years
Automatic Transmission Fluid	-	-	72,000 km	-	-	-
Automatic Transmission Filter	-	-	72,000 km	-	-	-
Spark Plugs	-	-	96,000 km to 156,000 km	-	-	-
Transfer Case Fluid (if 4WD)	-	-	161,000 km	-	72,000 km	24 months
Rear Axle Fluid (if AWD)	-	-	240,000 km	-	-	-
Engine Cooling System	-	-	240,000 km	6 years	240,000 km	6 years
Fuel Filter	-	-	-	-	36,000 km	2 years
Front Axle Oil	-	-	-	-	96,000 km to 156,000 km	12 months
Front Axle Bearing Grease	-	-	-	-	156,000 km	12 months
Power Steering Fluid	-	-	-	-	144,000 km	-
Power Steering Filter	-	-	-	-	144,000 km	-
Windshield Wiper Blades	-	-	-	-	12,000 km	6 months



At present most of the OEMs recommend a list of consumables/maintenance parts in owner's manual (including frequency)

Maintenance parts & consumables: Concept

- 1. Identify parts/services** for regular consumption/maintenance for each type of powertrain and vehicle type for guidance
 - Passenger cars (Category 1 vehicles)
 - Bus
 - Trucks
- 2. Frequency** :Frequency of consumption/maintenance according to OEM user manual or/and default values provided by the methodology
- 3.** Carbon emissions of each consumables/parts can be default value or primary data from OEM



Identification of parts & consumables: Category 1

		Gasoline	Diesel	CNG	NOVC-HEV	OVC-HEV	Pure EV	FCHV	OVC-FCHV	H ₂ -ICE	...	
 Consumables	Engine Coolant	✓	✓	✓	✓	✓	-	-	-	✓		
	Engine Lubricant	✓	✓	✓	✓	✓	-	-	-	✓		
	Screen Wash	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Break fluids	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Electric Drive Unit Fluid	-	-	-	✓	✓	✓	✓	✓	-		
	Transmission fluid	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Refrigerant	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	AdBlue/Urea	-	✓	-	-	-	-	-	-	-		
 Maintenance parts	Passenger Air Filter	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Engine Filter	✓	✓	✓	✓	✓	-	-	-	-		
	Spark plug	✓	-	✓	✓	✓	-	-	-	-		
	Windshield Wiper Blades	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Tires	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Brake linings	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	SLI Battery (12V)	✓	✓	✓	✓	✓	✓	✓	✓	✓		
	Aftertreatment	✓	✓	✓	✓	✓	-	-	-	-		
	Traction Battery	-	-	-	✓	✓	✓	✓	✓	✓	-	
	Fuel cell	-	-	-	-	-	-	-	✓	✓	✓	

Under discussion

**Methodology can provide a guideline of list of consumables/maintenance part, but it can not be exhaustive
OEM should provide all the assumptions (list , frequency, carbon emission) used for LCA study**

Next steps:

- Complete list of maintenance items
- Develop methodology determining frequency of maintenance
- Interaction with SG3 on availability of carbon emission data (primary /secondary)
- Proposal of draft text with technical justification