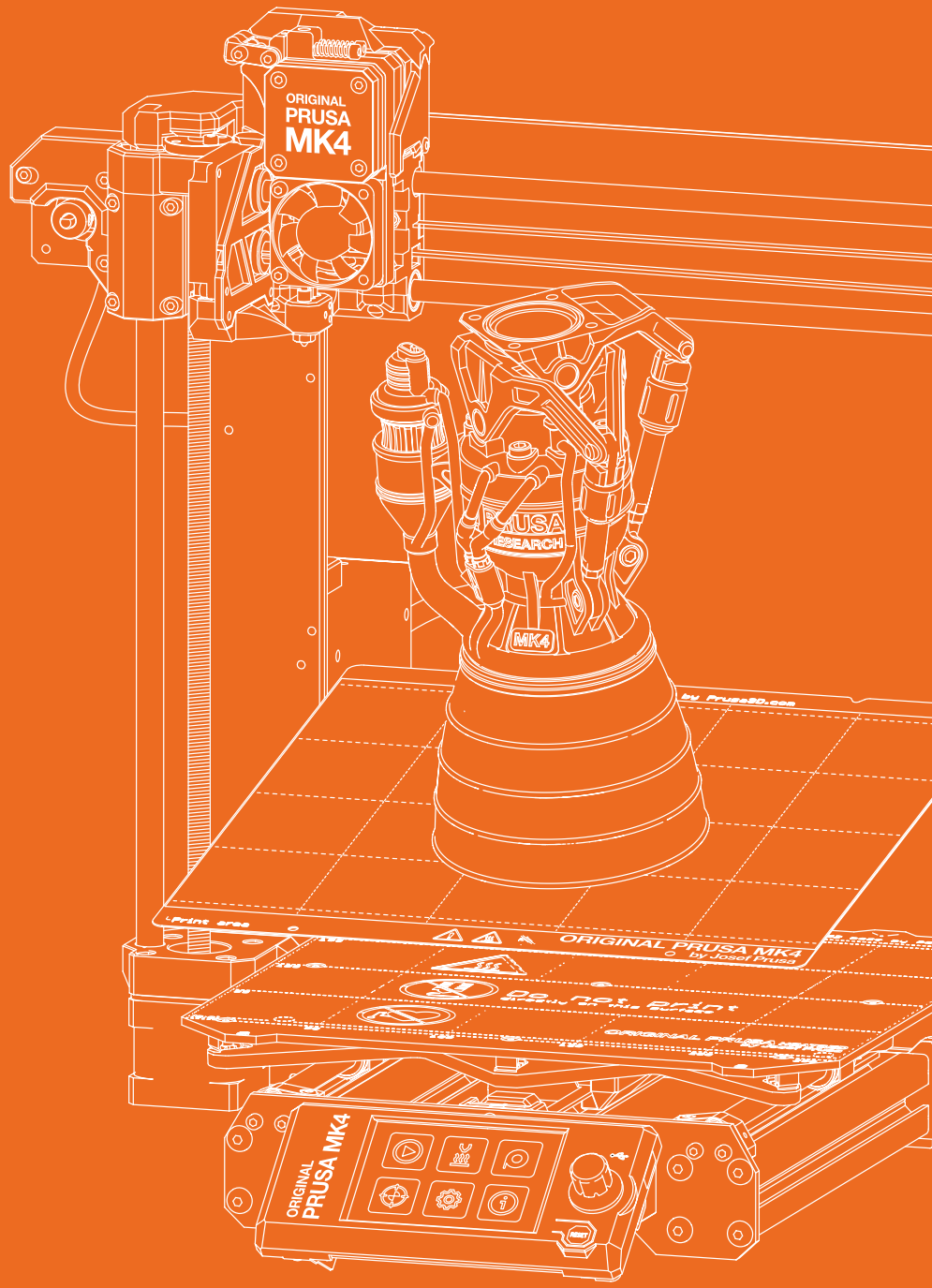
PRUSA PRODUCT PASSPORT
Original Prusa MK4



PRUSA
RESEARCH
by JOSEF PRUSA

One of the main commitments of our sustainability efforts is to design and manufacture printers that meet the requirements of the circular economy.

In practice, this means having products that are easy to maintain, upgrade, or repair. And when they reach the end of their lifespan, to be able to reuse or recycle them in some way. We aim to keep all the used materials in circulation for as long as possible. We also want to be more transparent about where the materials and components for our printers come from and their environmental impact.

The Prusa Product Passport includes:

- origin of the printer parts by country
- the carbon footprint of the printer
- info on maintenance, repairability, and spare parts
- info on upgrades
- description of the materials of each part for the purpose of recycling

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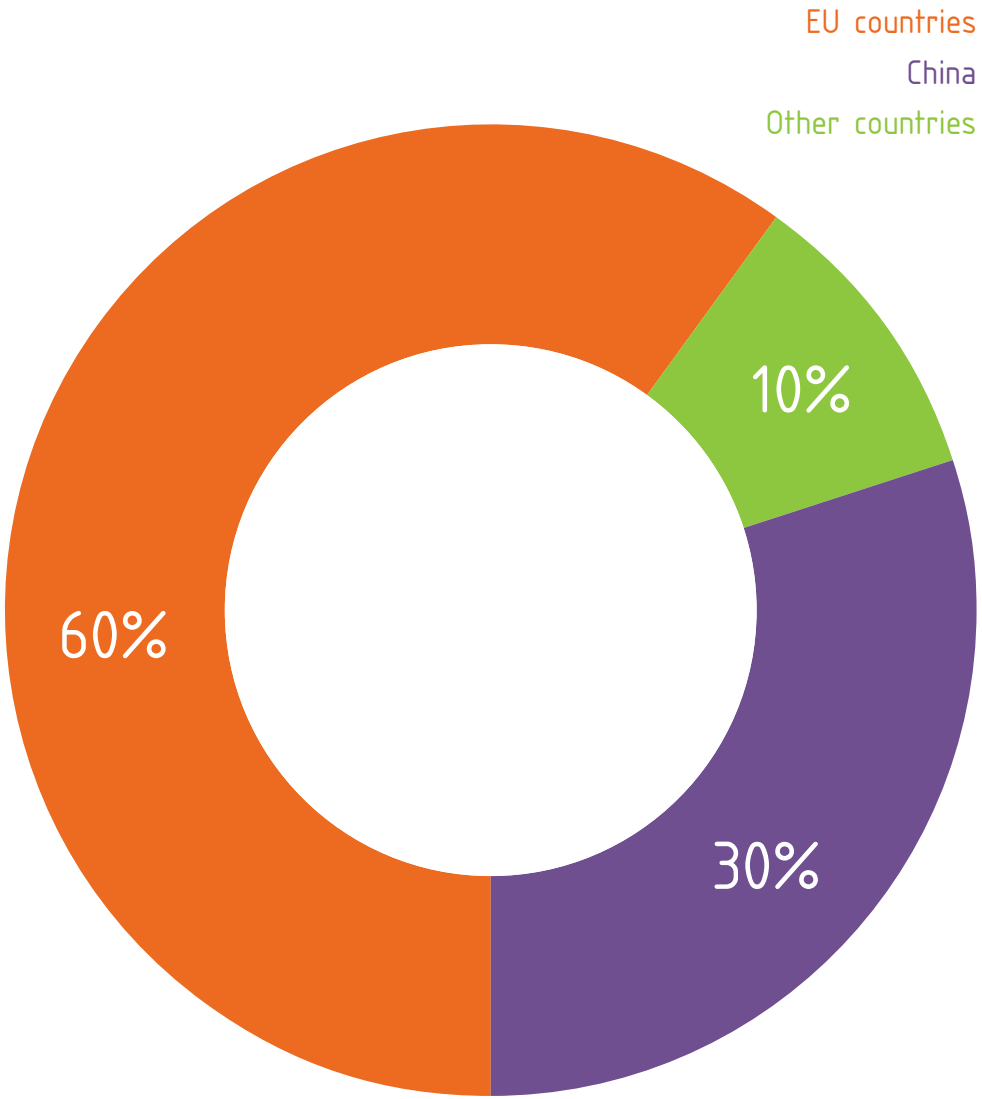
Our goal is to source the maximum amount of components for the production of our printers as close as possible to our production lines in Prague, or to produce them ourselves.

Parts by country of origin



The country of origin is defined as the state where the part was manufactured or assembled. The graph presents an average overview as the origin of components may change over time.

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The carbon footprint of the Original Prusa MK4

3D printer was calculated using the **cradle-to-gate** approach. The calculation is based on a life cycle assessment of the MK4 printer "kit" in scope including the **primary raw materials extraction and the production of input materials (including packaging), the transportation of the input materials to Prusa Research, and the actual production of the 3D printer at the company's site**. The carbon footprint was evaluated using the methodology and database Product Environmental Footprint (EF ver. 3.0), Ecoinvent 3.9.1, ELCD, and others per the requirements of **CSN EN ISO 14067**. The carbon footprint was calculated by Envitrail, TÜV NORD CERT GmbH-certified company, and independently verified by CI3 company.

The carbon footprint of the MK4 3D printer falls within **the range of 81.95 – 98.16 kg CO2-Eq**. We provide a range of carbon footprints because the emission factors for different types of materials depend on the location and technology of production, as well as on the sources of energy used, especially electricity. For the calculation, we utilized the most accurate available emission factors corresponding to the specific materials from which the printer components were made. The communication of a range of carbon footprints is now an increasingly common and recommended interpretation, reflecting the complexity of the calculation.

Diagram of the manufacturing system

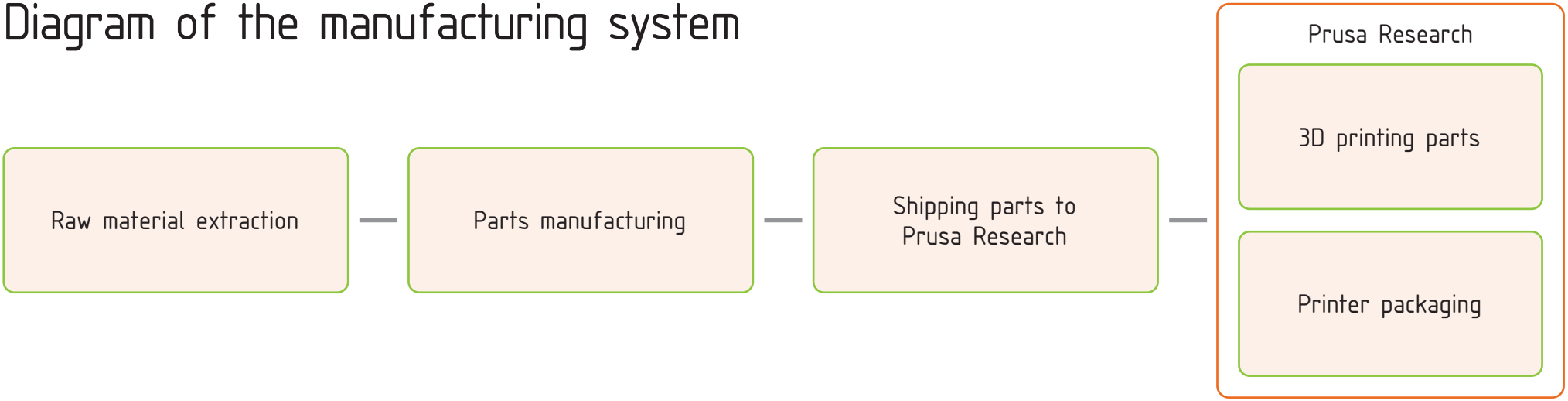
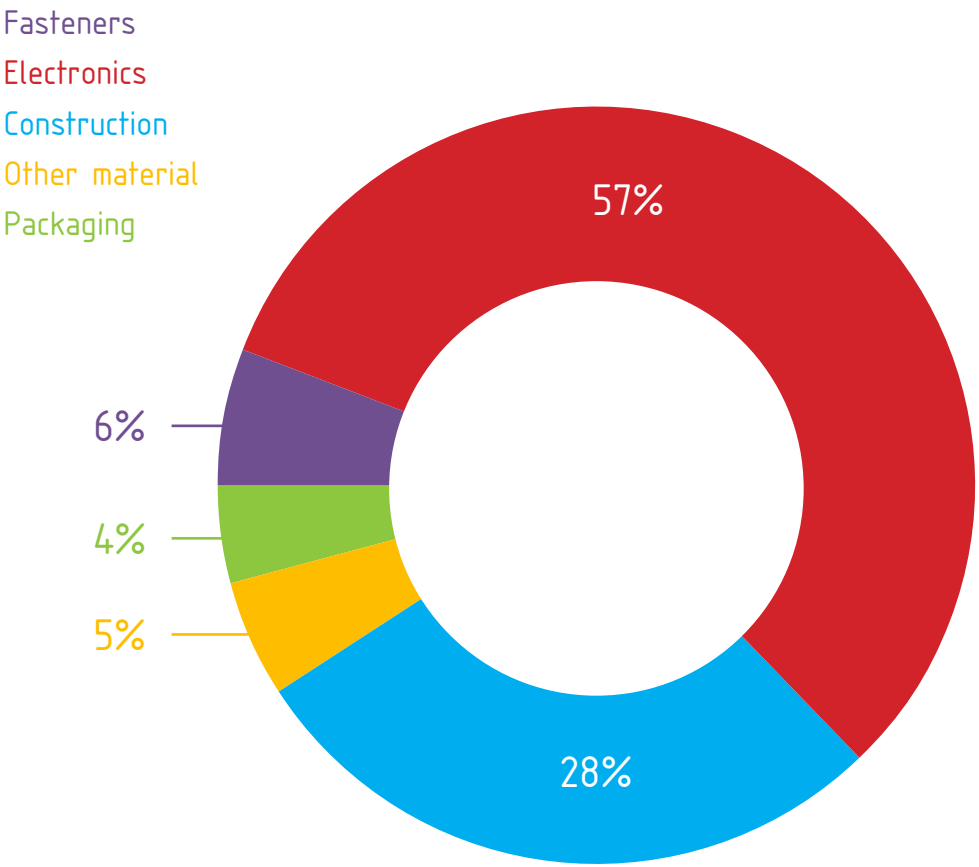


Diagram of the carbon footprint by printer life phases

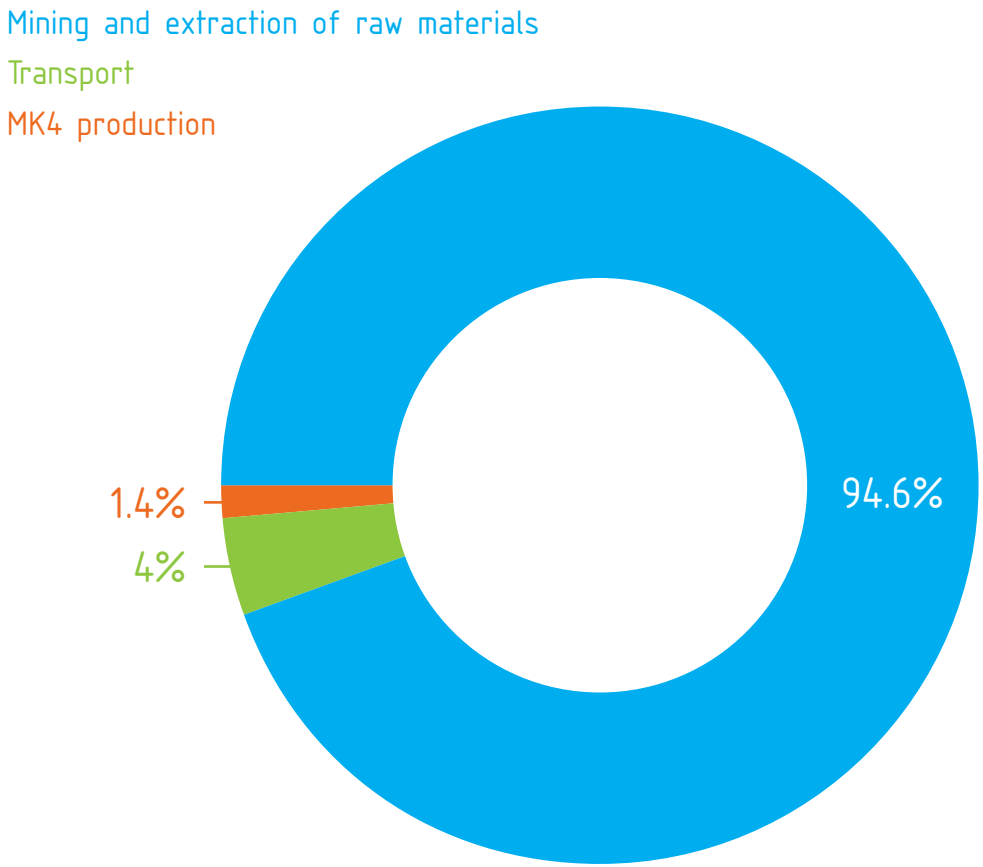
The most significant phase of the carbon footprint life cycle is the production of electronic components (accounting for 57%), in particular the Delta Source, Motor Kits, and Electronics – xBuddy 37.

The transportation of components to Prusa Research accounts for 4% of the carbon footprint. The predominant impact is from truck transport.

Mining and raw material extraction phase



MK4 Carbon footprint



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It’s not just about the carbon footprint!

Printer production has been evaluated in several environmental impact categories such as the use of energy and materials resources, ozone depletion, photochemical oxidation, acidification, and eutrophication. Below we describe those that, according to the life cycle analysis (LCA), were the most significant for our printer.

Materials resources: metals/minerals

This important environmental impact category sums up the use of raw materials (renewable - water, biomass, and non-renewable - fossil fuels). The most common impacts are the extraction of raw materials, deforestation, and humus depletion by intensive agriculture. This leads to a decline in the quality of ecosystems and the extinction of biological species, and in regards to non-renewable materials, to a shortage of raw materials in the future. These parts have the biggest impact: the internal power supply, LCD panel, and printer frame.

Acidification

It is a process of acidification of the soil or water environment, caused by the release of substances such as nitrogen and sulfur oxides or ammonia into the atmosphere, water, and soil. Acidification results in damage to vegetation, threats to human health, and a reduction in biodiversity. These parts have the biggest impact: internal power supply, LCD panel, and motor kits.

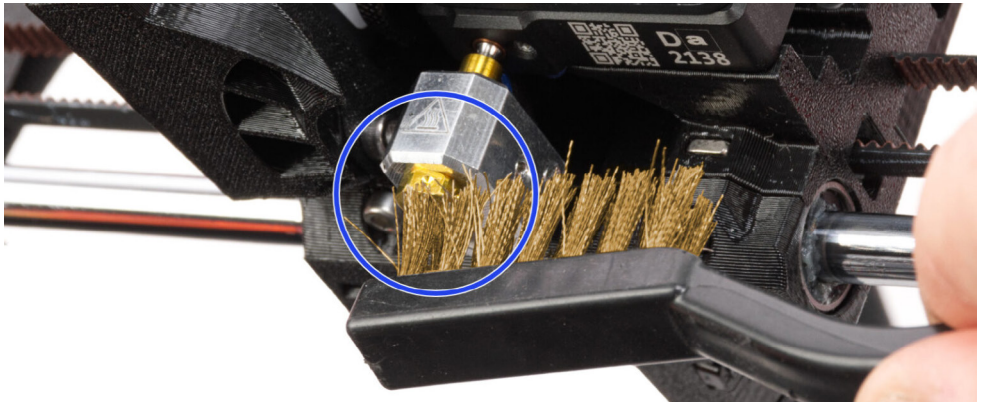
For a better idea, the MK4 printer’s carbon footprint equivalents are presented below.

The carbon footprint of the MK4 cradle-to-gate (3D printer production) is comparable to one passenger’s round trip by train from Prague to Amsterdam.	Ecoinvent, Life Cycle Inventory (LCI) datasets, ecoinvent database, version 3.9.1. (2022), process: transport, passenger train | Cutoff, S, method EF 3.1, https://ecoquery.ecoinvent.org/3.9.1/cutoff/dataset/5258/lci
The carbon footprint of producing two MK4 units can be compared to the carbon footprint of producing one average laptop.	Ecoinvent, Life Cycle Inventory (LCI) datasets, ecoinvent database, version 3.9.1. (2022), process: computer production, laptop, APOS, GLO, method EF 3.1 https://ecoquery.ecoinvent.org/3.9.1/apos/dataset/2077/lci

Maintenance, repairability and spare parts

We want your printer to last as long as possible.

We recommend regular maintenance of your printer.
Inspection and maintenance of printer components should be carried out every few hundred printing hours. Instructions can be found here.

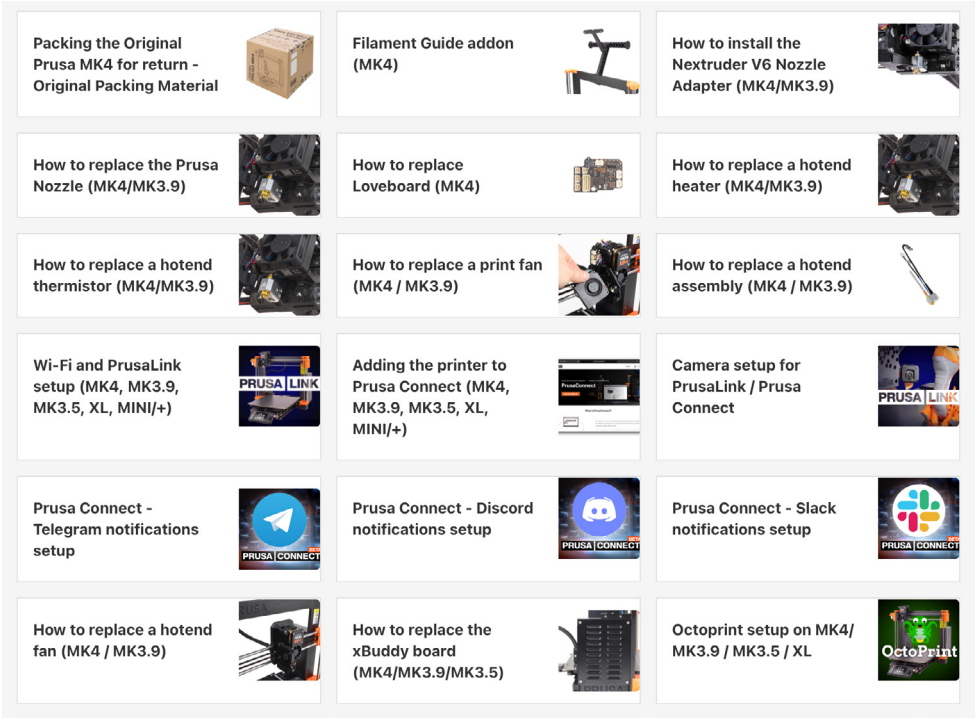


We make sure that our printers are easy to repair.
A wide range of **spare parts** can be found here.

We're staying true to our open-source roots: You can freely access firmware and software source codes and download printed parts of our machines at Printables.com and modify them. There are plenty of 3rd-party additions for our printers and we're not limiting the creativity of enthusiasts or other manufacturers with needless copyrights and trademarks.

If a part of your printer stops working and is no longer under warranty, we've put together easy-to-follow repair guides or check the troubleshooting section on our web.

Also, you can always discuss your issue in one of our community forums or contact our 24/7 technical support.



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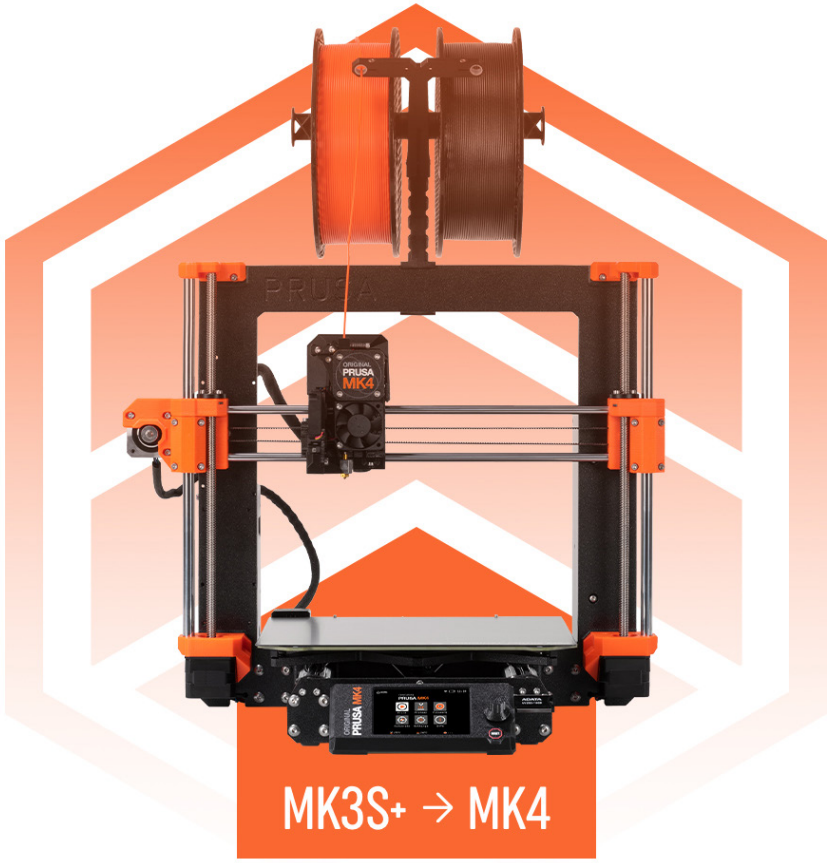
Upgrades

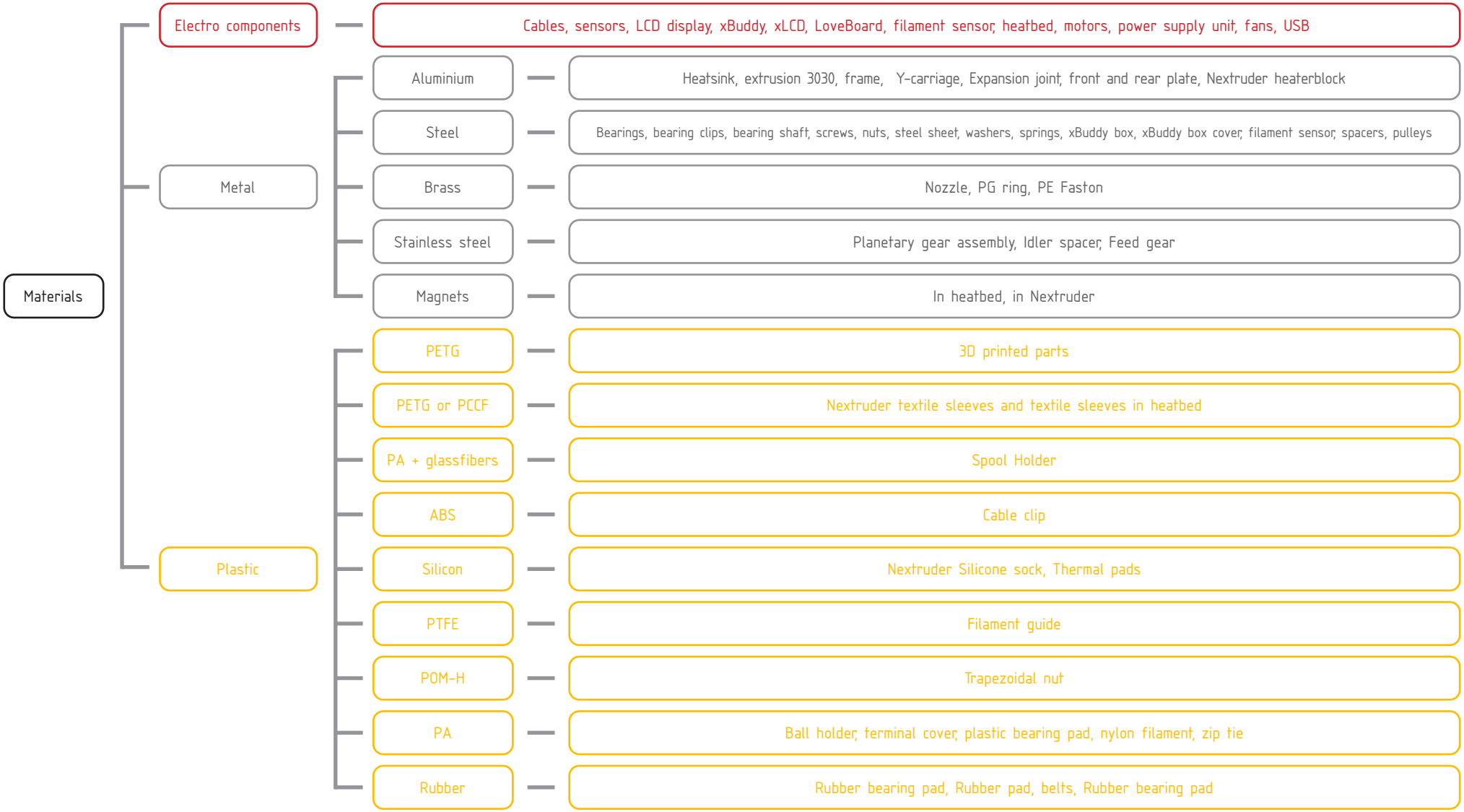
Older models of our printers retain their value longer thanks to the ability to upgrade to a newer model.

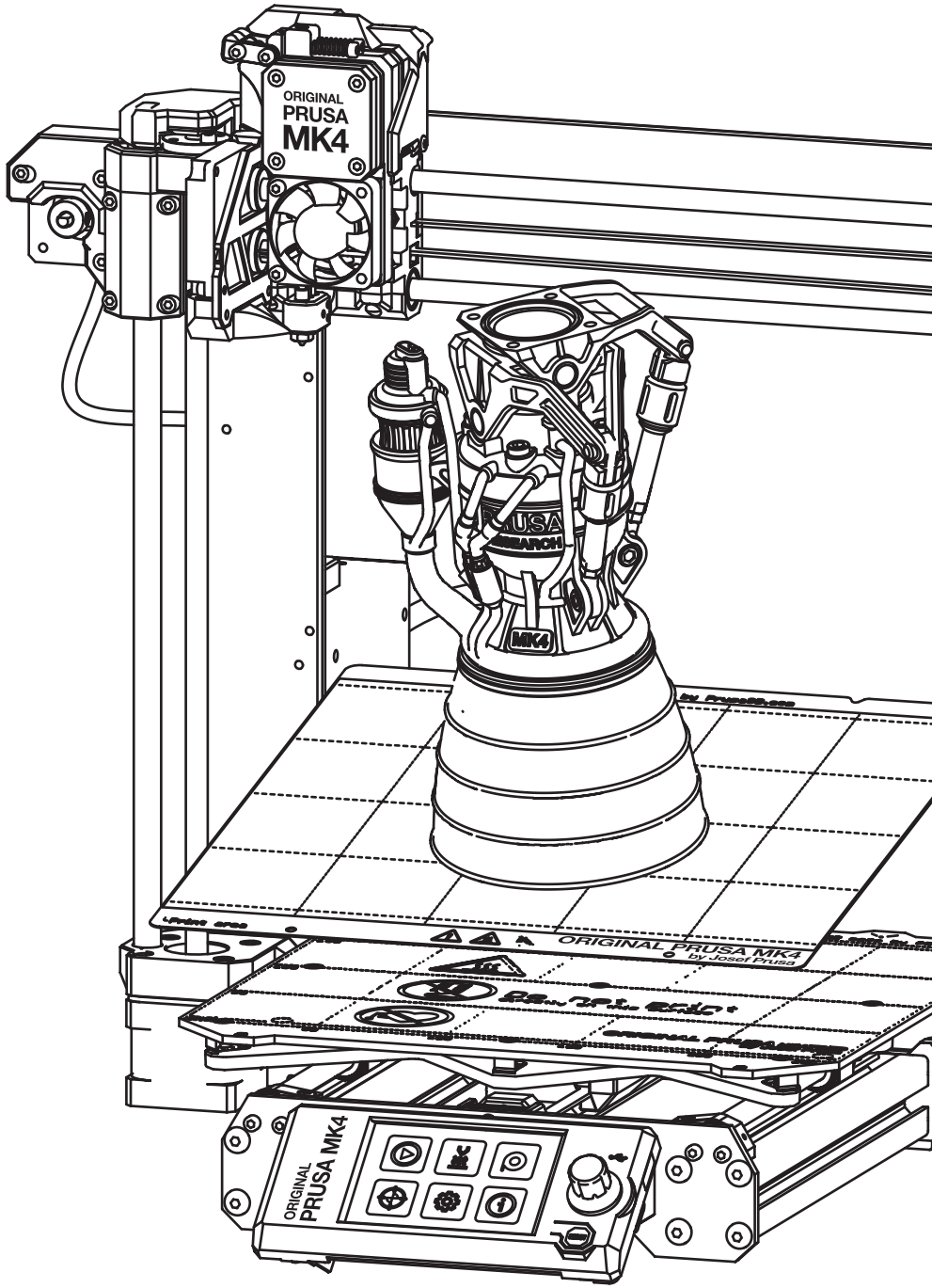
So if you don't feel like buying a new printer, check for relevant upgrades we offer for your current printer.



Material identification

When a component reaches the end of its lifespan and you want to recycle it, you have to find out what material it is made of. We have prepared an overview to help you with this.

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