

The variety of materials available for metal AM systems is continuously expanding. Common materials used are stainless steels, aluminium, nickel, cobalt-chrome and titanium alloys, with a number of machine manufacturers offering their own materials.

The most common materials for laser melting processes are shown in the table opposite. The material trade names vary depending on the manufacturer, therefore the name used here corresponds to the specifications on the material data sheets and in some cases the European nomination is given.

There are some efforts in standardisation of the processes and the materials, an important step for a better comparison between products and a faster introduction to existing process chains.

This wide variety of materials offers the user a good possibility of choosing the right material to achieve the specifications of the product.

Research institutes, universities and system manufacturers also offer individual materials for the customer.

Not all materials can be used in Additive Manufacturing, but in many cases and with the proper equipment the qualification of an available metal powder for a specific purpose can be done.

Specifying metal powders

The common specifications of metal powders suitable for AM are the spherical geometry of the particles resulting from the gas atomisation and a particle size distribution according to the layer thickness, usually between 10-50 μm .

Material properties such as tensile strength, hardness and elongation, are important and often used as reference points for the decision about the right material. The figure below illustrates some different alloys in an extensive range of yield strengths. This diagram can help the user to pick the appropriate material depending on two mechanical characteristics. The values for the yield strength have been taken from the manufacturer's data sheets and represent the minimum measured values.

