



FENIX technologies has been used to evaluate a different recycling business: the complete recycling of hardmetal indexable inserts. The Mechanomade® process has been used to obtain a **recycled hardmetal powder**

The powder is used to make an ink for the **FENIX DIW Printer**, from which is possible to obtain new inserts with new or different shapes, that requires a final step of sintering before being used. Before being launched, the development of the business case still requires some validation on the performance of the inserts, but the results achieved prove its technical feasibility.



Printed insert dried and ready to be sintered

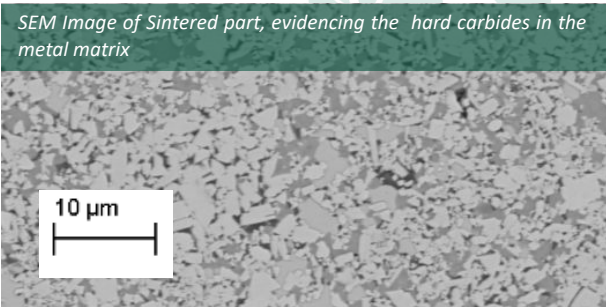
Description of its use

Hardmetal inserts are made of Cemented carbide and are extensively used as *cutting tool insert*, as well as other industrial applications due to its corrosion resistance, hardness and wear resistance. These tools are widely used in several mechanical process thanks to their high performance in terms of durability, machining speed and quality of surface finish than other steel tools.

Once the insert is worn out or chipped, it is substituted with a new one, since its cutting ability is due to the cutting edge. So the insert becomes useless when most of its material is still intact and valuable to be recycled (W, Co, Ta, V are some of the elements present in Hardmetals).

Main Characteristic Figures

	Value
Recycled Material	100%
Source of Material	Worn/broken Inserts
Binder Type	Hydrogel
Printing Time	15min per insert
Printing Method	DIW/Robocasting
Toolpath Technique	Concentric outlines
Weight Loss	negligible
Shrinkage	3%



SEM Image of Sintered part, evidencing the hard carbides in the metal matrix



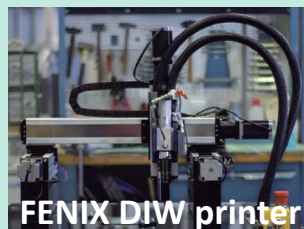
Examples of uses of Hardmetal Indexable Inserts

Debinding and Sintering

The part dries in air after printing and is ready for the sintering cycle.

Full metal sintering at 1500°C, in reducing atmosphere and supported by alumina sand

The Printer



FENIX DIW printer



■ Printing
■ Debinding & Sintering

The above data represent typical, average values obtained in accordance with accepted test methods. These data, however, as well properties of any product sample do not imply any legally binding assurance or guarantee. We recommend all users to determine the suitability of the products for their intended uses or for a specific purpose. These results have been obtained thanks to the H2020 Innovation Action – FENIX - this project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N. 760792

