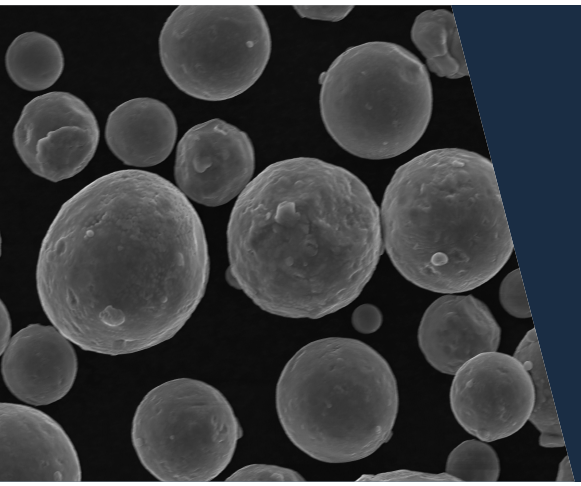
AncorWear



AncorWear

AncorWear is a line of premium wear resistant metal powder alloys, optimized for use in Laser Powder Bed Fusion (LPBF). The use of LPBF allows for the formation of intricate shapes and part designs typically not possible with wear-resistant alloys due to their resistance to deformation and machining. AncorWear alloys are available covering a range of hardnesses and mechanical property combinations, allowing the user to choose the optimal alloy for the final application.

Typical Material Properties

Alloy	UTS (MPa)	Y S (MPa)	Elongation (%)	Apparent Hardness (HRC)
AncorWear 500	993	903	18.1	21
AncorWear 600	1469	1255	12.5	49
AncorWear SPL	1482	1269	13.1	45
AncorWear S7	1269	876	2.8	52
AncorWear SS	896	662	8.7	38

All alloys tempered at 540 °C

- AncorWear 500 - Made to mimic conventional abrasion-resistant plate steel; typically difficult to form into intricate shapes
- AncorWear 600 - Made to mimic conventional abrasion-resistant plate steel; typically difficult to form into intricate shapes
- AncorWear SPL - A chromium/nickel free alloy similar to the 500 and 600 grades, but designed to meet health and safety requirements where chromium and nickel are not permitted
- AncorWear S7 - A typical tool steel, but with the advantage of good impact and shock resistance; has good resistance to softening at moderately high temperatures with excellent combination of high strength and toughness
- AncorWear SS - A stainless steel that has high hardness but provides abrasion resistance when moderate corrosion resistance is also needed

Nominal Chemical Composition (wt%)

Alloy	Fe	Mo	Ni	V	Mn	Cr	Si	C
AncorWear 500	Bal.	0.6	0.7	-	1.4	0.7	0.5	0.2
AncorWear 600	Bal.	0.4	4.1	-	0.6	1.3	0.2	0.4
AncorWear SPL	Bal.	1.5	0.1	0.1	1.0	0.1	1.2	0.2
AncorWear S7	Bal.	1.6	-	0.3	0.8	3.2	1.0	0.5
AncorWear SS	Bal.	0.2	1.6	-	0.1	11.9	0.9	0.0

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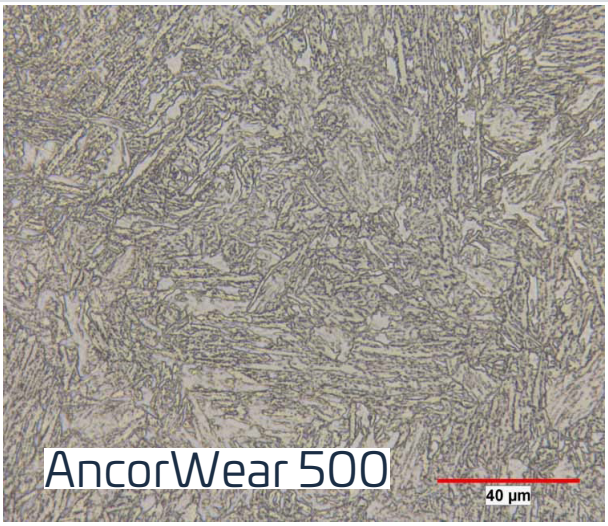
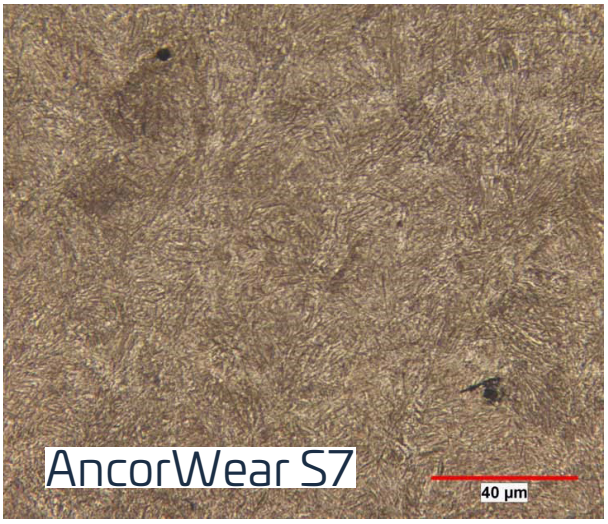
AncorWear

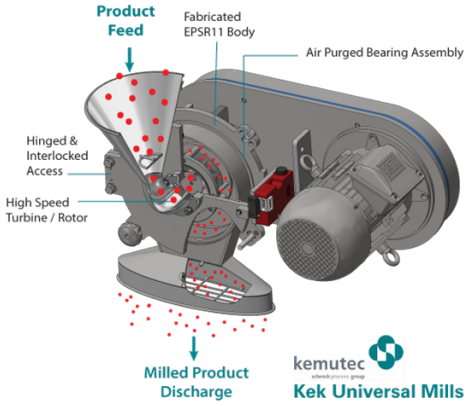
Etched Microstructures - All samples were tempered at 540 °C

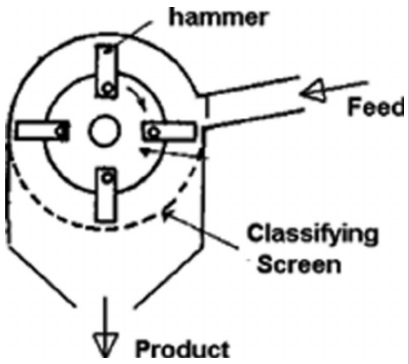


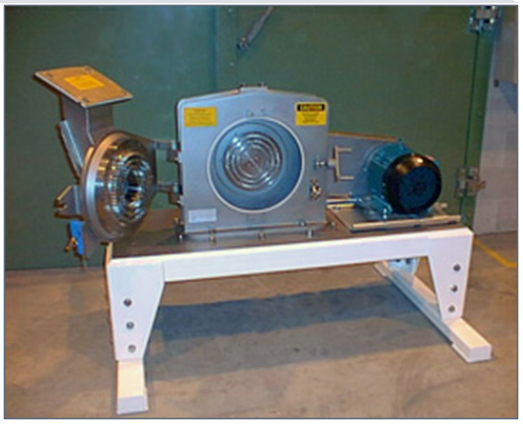


AncorWear

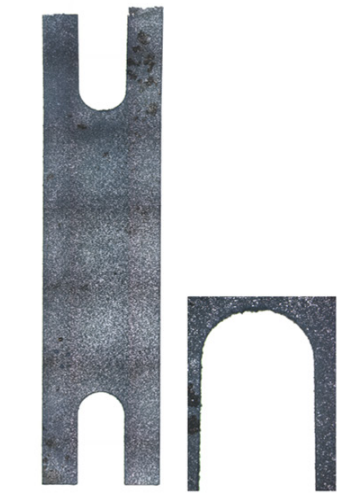
Case Study: Advantages of design freedom using LPBF for wear resistant parts in a hammer mill







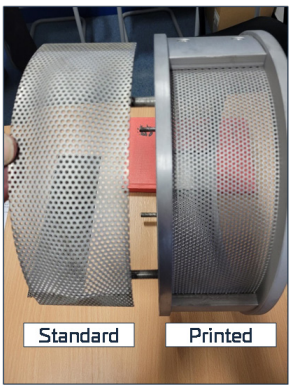
Hammers produced with LPBF exhibit similar wear behavior to standard production methods; worn hammers shown after grinding ~ 1,150 kgs of Fe-Ti-Mn alloy

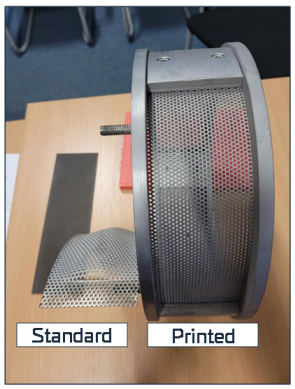

Hammer before use


Machined hammer used


LPBF hammer used

Standard screens wear more quickly (increasing hole diameter) and failed after ~1,150 kgs of Fe-Ti-Mn processed; LPBF screens still highly functional





Full case study presented at World PM 2022 Congress & Exhibition:
Development of Wear Resistant Alloys for Use in Laser Powder Bed Fusion

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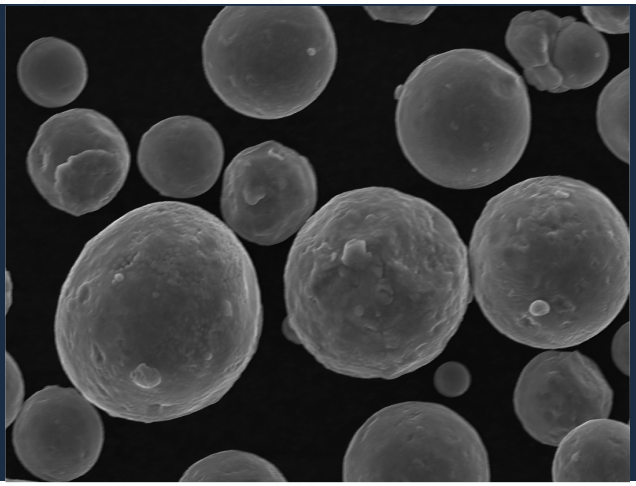

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