

D2.2 Magnesium recycling routes optimization

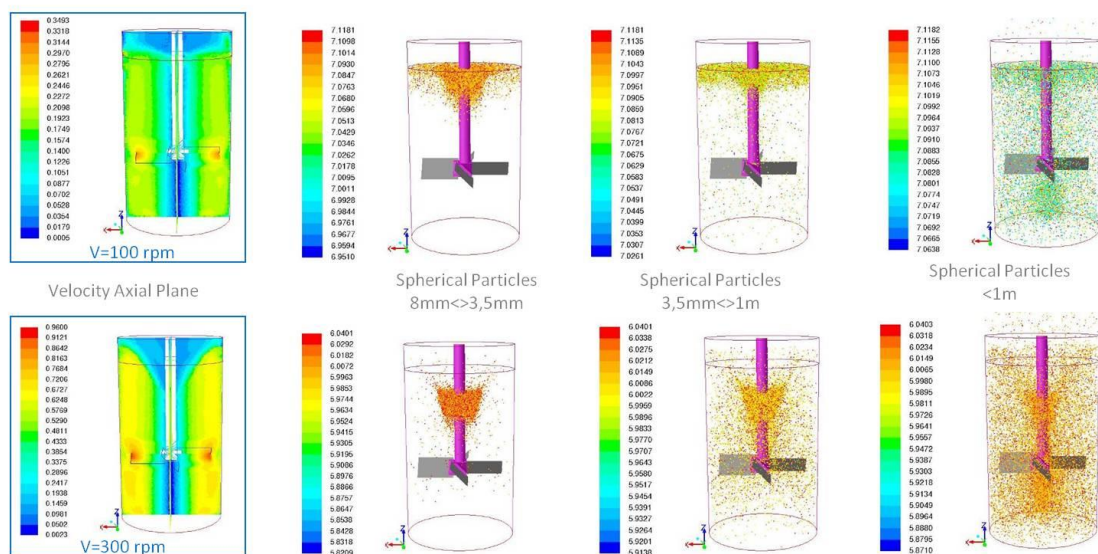
With the information coming from the previous task the optimization of the recycling process for each material (scrap and scum) was developed. For all the options studied, casting and validation tests have been done and measurements made in order to evaluate the process efficiencies depending on the initial input materials.

- In the case of the scrap material: a fluxless procedure was defined obtaining minimum process efficiency higher than 80%. Furthermore, a spreadsheet was created in order to know how the different kinds of scrap could be introduced in the recycling furnace.

AM60 Mix rules											Data input from trials performed (fixed values)		Percentage and kilogram that will enter to recycling furnace (required input data)			
Input Material	%Mg	%Al	%Zn	%Mn	%Fe	%Cu	%Ni	%Be	%Si	Others	Auto-Alloy Yield	Kg raw material/Tn AM60				
AVERAGE NoK Parts	93,400	6,050	0,110	0,319	0,0031	0,0006	0,0020	0,0005	0,039	0,076	50,0%	333				
AVERAGE Biscuits&Gates	93,400	6,195	0,092	0,248	0,0065	0,0006	0,0020	0,0005	0,046	0,009	0,0%	333				
AVERAGE Overflows	93,300	5,930	0,107	0,268	0,0015	0,0006	0,0020	0,0007	0,037	0,333	50,0%	333				
Internal Calculation																
AVERAGE NoK Parts	165,511	10,07325	0,18315	0,53114	0,00516	0,001	0,0033	0,0008325	0,064935	0,126207						
AVERAGE Biscuits&Gates	0	0	0	0	0	0	0	0	0	0						
AVERAGE Overflows	165,345	9,87345	0,17816	0,47952	0,0025	0,001	0,0033	0,0011655	0,061605	0,554778						
TOTAL	310,856	19,9467	0,36131	1,01066	0,00766	0,002	0,0067	0,001998	0,12654	0,680985						
Percentage of auto-alloy and error respect to standard values																
Auto-Alloy Composition	93,35000	5,99000	0,10850	0,30350	0,00230	0,00060	0,00200	0,00060	0,03800	0,20450	0,00758					
Error	0,02400	-0,01000	0,09150	-0,07650	0,00170	-0,00740	0,00100	-0,00040	-0,04200	0,20450	-0,013					
AM60 (error)	93,32600	6,00000	0,20000	0,38000	0,00400	0,00800	0,00100	0,00100	0,08000	0,00000	0,02100					
AM60 ASTM B93:93M ingot	balance	5,6-6,4	<0,2	0,26-0,5	<0,004	<0,008	<0,001	5-15ppm (0,0005-0,0015)	<0,08	---	0,021max	Yield	Kg /Tn AM60			
GAM Alloy AM60 ingot B	93,4	5,99	0,109	0,30	0,0023	0,0006	0,0020	0,0006	0,04	0,20450	0,008	100,0%	1000,0			
Medium values error accepted													Final composition to be obtained and standard comparison		Yield and kg/Tn of AM60 expected	

AM60 mix rules Spreadsheet

- In the case of the scum material, the work was focused on the definition of a flux recycling process. The efficiency was measured and the value obtained was much lower than for scrap material. But as these results can be interesting from an economic point of view, Grupo Antolin will assess this process feasibility in the exploitation analysis.



Stirring analysis for flux recycling process