Current thermal processes for the treatment of metals contaminated with impurities, especially with high contents of organic compounds, present problems in obtaining the metal fraction: the metal fraction oxidises with increasing prooxide layer forms on the surface, which results in metal loss and metal y[illegible]eld can be low (loss of material as high as 20%, with the [illegible]hinner the scrap, the higher the losses). Conventional a[illegible]minium recovery methods based on scrap melting a[illegible]e most widely used by secondary metal recyclers, in[illegible]ing high energy consumption and CO_2 emissions. Ind[illegible]n melting with protective atmosphere can also be us[illegible]t due to the higher cost of electricity compared to [illegible] gas, induction furnaces are less used [3]. In Vortex [illegible] system, which consists of a vortex that is gener[illegible] stirring mechanical or electromagnetic device[illegible] added to the vortex and due to the speed and m[illegible]produced in the vortex, chips are immersed in[illegible] metal and they are melted in a short period[illegible]s system presents problems for melting lacq[illegible]nium or aluminium containing plastics, unle[illegible] atmosphere is employed. The tra Vibración SL, Spain) was employed. Carbon wt.% was determined with an Automatic Analyzer, model CS-400, At 300°C an oxidation process starts, since it is not possible to reduce the value reached afterwards. It was so defined a maximum treatment temperature at the oxidant stage of 300°C.

Seven tests were performed to determine the maximum treatment capacity of the furnace in its oxidising atmosphere treatment stage and the effect of the inert atmosphere treatment stage in the designed pilot plant. Different feeding rates and process parameters were defined at the semi-industrial trials, as shown in Tab. 2.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fe[illegible] (g/h)	30	60	90	120	90	120	120
Oxida[illegible]p. (°C)	450	450	450	450	300	300	300
Resid[illegible]dant	10	5	5	5	15	30	30
Produc[illegible]t of oxid[illegible]	265	380	440	480	135	135	135
Inert fu[illegible]	20	20	20	20	-	-	450
Residence[illegible] furn[illegible]	4	4	4	4	-	-	15
C (w[illegible]	0.28±0.0	0.46±0.2	0.34±0.1	0.39±0.1	4.77±0.4	4.33±0.9	1.03±0.1
O (wt.%)	[illegible].11±0.30	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[redacted]

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