Dear Client,

I would attack this problem chemically with a series of timed tank dips. The general principle is to utilize the temperature gradients of the burrs and their relatively narrow cross section post injection molding and timing the reaction to remove / dull only a certain (controlled) percentage of the aluminum cast. To do this effectively, molding will have to be done in the absence of oxygen to maximize the reaction as that first layer can vary. However, the concept will still work if that step is not done, it will just take longer and the results might be a little more unpredictable. A choice of three options are proposed below. Naturally, the residue of the specific acid (or combinations of acids) would need to be neutralized in the series of dips and hydrogen would need to be vented away from anything hotter than 997 F. Alternatively, the hydrogen could also be ignited in a controled environment for power or heating of the factory.

Aluminium reacts with dilute hydrochloric acid to give aluminium chloride and hydrogen gas.

- aluminium + hydrochloric acid —> aluminium chloride + hydrogen
- 2Al(s) + 6HCl (aq) —> 2AlCl3 (aq) + 3H2(g)

Aluminium reacts with dilute sulphuric acid to give aluminium sulphate and hydrogen gas.

- aluminium + sulphuric acid —> aluminium sulphate + hydrogen
- 2Al(s) + 3H2SO4(aq) —> Al2(SO4)3(aq) + 3H2(g)

Aluminium reacts with dilute nitric acid to give aluminium nitrate and hydrogen gas.

- aluminium + nitric acid —> aluminium nitrate + hydrogen
- 2Al(s) + 6HNO3 (aq) —> 2Al(NO3)3 (aq) + 3H2(g)

The ratios and timing would require significant experimentation to get the desired result.

There has also been research into inhibiting corrosive effects of HCL on aluminum substrate such as using Date Palm Leaf Extract research as attached. Date Palm Leaf Extract is considered environmentally friendly. Alternatively one could selectively annodize the aluminum outside of the burr area's. Using either technique, or one similar, we would be looking to slow the weight loss in the critical areas while allowing weight loss in the areas which contain the burrs. The assumption is if there is a burr, than that would not likely be a critical area.

Regards with thanks,

Jeff.