1. Project assumptions:

- Part specification:
    - Parts dimensions: minimum 400 x 400 x 100, maximum 600 X 600 X 600 mm.
    - Very irregular surfaces
    - Weight part: between 3-12 Kg.
- Part injection output temperature: 70ºC
- Burr (see sketches and pictures in the attachments)
    - Thickness is 0,1 - 0,5 mm. long: 10mm.
    - Length: 10 – 50 mm. (desirable)
    - Can be inside or outside the part.
- Should operate according to a 70 sec. cycle time (includes load, operation and unload).

2. Process selection

Based on above impute data to manage complexity of process and size of the part the only processes taken under consideration are those which has liquid or gas medium as a transporter. This will allow to penetrate medium in all parts irregular surfaces.

This criteria limits processes to :

- Chemical etching
- Electrochemical polishing/deburring
- Thermal energy deburring
- Electrolyte-plasma

Below comparison of chosen processes based on basic assumptions and future application complexity

In red marked all disadvantages, green all advantages

Mechanical method added for comparison only

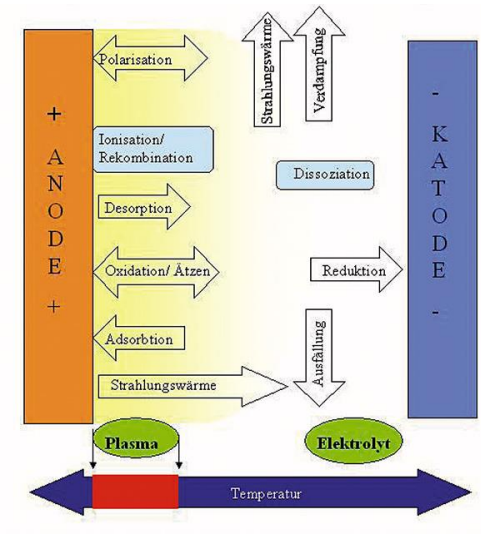
Method	Mechanical	Chemical	Electrochemical	Thermal Energy Method (TEM)	Electrolyte-plasma
Parts dimensions: minimum 400 x 400 x 100, maximum 600 X 600 X 600 mm.	No size limitations	No size limitations	No size limitations	Max chamber size Ø450x500mm	No size limitations
Very irregular surfaces	Very difficult to process,	Liquid can access all surface	Liquid can access all surface	Gas can access all surface	Liquid can access all surface
Part injection output temperature: 70ºC	Need cool dawn process	Need cool dawn process	Process operating temperature 30-60ºC	Need cool dawn process	Process operating temperature 60-80ºC
Burr Thickness is 0,1 - 0,5 mm. long: 10mm.	No size limitations	Increased cycle time	max size 0,5 mm	max burr size 0.25mm	max size 0,5 mm
Can be inside or outside the part.	Very difficult to process,	No influence on process	No influence on process	No influence on process	No influence on process
Should operate according to a 70 sec. cycle time (includes load, operation and unload).	>10min	10-20 min	5-10s	2s	5-20 s
Process complexity	Depends on part complexity	Very Complex	Medium Complex	Easy	Medium Complex
Change to processed material	Can damage surface or corners	Unevenness of treatment, etching	Polishing surfaces	Oxidised surface	Hardening of the material, polishing surfaces
Energy consumption	Medium	Low	High	Medium	High
Material cost	High	High	High	High	Low
Chemical process features	None	with the use of solution in following: Sulfuric Acid , Hydrochloric Acid , Nitric Acid , Sodium Chloride, Water	In three-component electrolytes, containing phosphoric, sulfuric and chromic acids	A fixed volume of methane gas (the fuel) and oxygen	Use of non-toxic water-dissolved salt compounds in low concentration Residue-free rinsing in normal or process water without the use of detergents

Based on above analyze two processes meets required criteria:

Electrochemical etching and Electrolyte-plasma but due to further investigation

Proposed solution is **Electrolyte-plasma**

3. Process sketches



4. Feasibility evidence

https://www.youtube.com/watch?v=lBPDwiwuICo