International Students Olympiad in Hot Bulk Forging
and Extrusion Technologies 2020

Profile extrusion

Task

A profile extrusion company received an order to produce a 25 tons batch of semi-hollow aluminium profile (Fig.1) from **AA6060-T5** alloy. A press for direct extrusion with **260 mm container** diameter was chosen to fulfill the order. Nominal load of the press is **28 MN**. Using simulation of profile extrusion process, develop a die set design necessary for the order and choose technological parameters of the process.

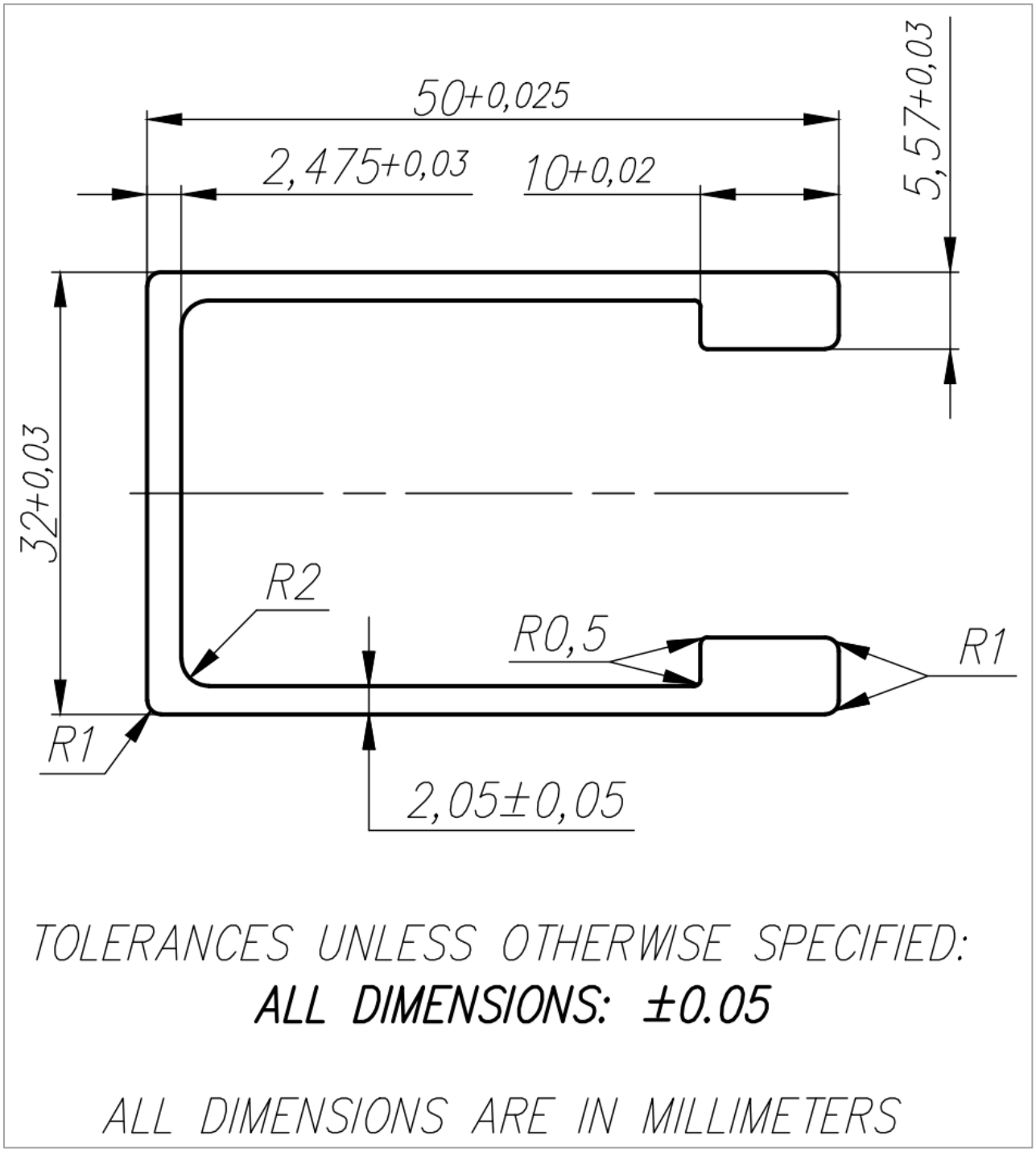

Fig.1. Profile

Task notes

Create a report containing description of task execution, process simulation and steps of results analysis including calculations and technology verification. Use QForm as a tool for assessment and justification of the proposed technology.

Quality, reliability and reasonability of approaches used to solve technological problems have an influence on the final mark, taking into account the following criteria:

- balance of material flow and lack of profile intersection with die set
- adjustment of extrusion temperature-velocity mode
- profile orientation on the die face
- adjustment of extrusion load mode (selection of billet length)
- analysis of die stress-strain condition
- productivity rate of the proposed technology (number of profiles extruded simultaneously and weight of profile per 1 press stroke)
- universality of proposed components of support tools
- analysis of potential extrusion defects; prediction and elimination
- suggestion of appropriate heat treatment

6 hours provided to design the technology, to simulate it and to create a report using a text editor.

At the end of the work create an archive (use special number provided by committee to name the archive) including the report and resulting simulation files of a single final version of technology. Report title and QForm files have to contain your special number. Name of participant shouldn't be specified.

Additional data

Overall dimension of die set – **130 mm**
Total overall dimension of bolsters – **270 mm**
Material conditions – **T5**
Other requirements – according to local standards