



Machine Design Exercise

This exercise will assess your ability to tackle open-ended design challenges like those you might encounter at Rebound. It will provide insight into your problem-solving approach, technical communication and enthusiasm for the position. Please note that the problem is fictitious, and the results will only be used for assessment purposes.

What should you send?

The deliverable is a PDF document clearly describing your solution. Drawings, calculations, model results, and recommendations for further work are encouraged. We encourage you not to take more than 1-2 hours to complete.

Where should I send it?

Please email your PDF to careers@rebound-tech.com.

What resources should you use?

Use any resource you wish. This is not a test of your ability to solve problems in a vacuum, but instead to test your real world problem solving skills. Feel free to scour the Internet, the literature, equipment manufacturers, etc.

Problem Statement for Exercise

You are a machine design engineer at an ice cream company. Your marketing team has just come to you with the discovery that carbonated ice cream is going to be the next big craze. After some bench-top testing, your team finds that mixing granular dry ice with the cream mixture under 5 bar of pressure results in the perfect product. However, the frozen ice cream must be promptly removed from the dry ice supply to prevent off-tastes.

Your team's task is to design a machine that produces a continuous stream of 1 kg/min of ice cream when an employee at the ice cream shop connects it to a drum of dry ice granules and a drum of cream mixture. The thermal engineer from your team has determined that the cream mixture and dry ice should be mixed in a 10:1 mass ratio, it takes 60 seconds after contact for the dry ice to sublimate/dissolve in the cream, and 5% of the carbon dioxide dissolves.

Please produce a preliminary design document for a design review with the rest of your engineering team, a sales/marketing representative, and a manufacturing representative. Since you are working on a short deadline, focus on the critical decision points but mention what additional work should be done.