Requirements Sheet

Team Number ____

Product Type:  

City Bike

1. Market Description

This bicycle is to be designed for the mass consumer market. The expected sales volume is 100,000 per year. Affordability, excellent performance/cost ratio and light weight are most important to be successful in this market.

2. Requirements

Manufacturing Cost (C):  

\[ C \leq 4.2 \text{ }$/part\]

Performance \((\delta_1, \delta_2, f_1)\):

Displacement \(\delta_1 \leq 0.071 \text{ mm}\)
Displacement \(\delta_2 \leq 0.011 \text{ mm}\)
First natural frequency \(f_1 \geq 245 \text{ Hz}\)

Mass (m):

\[ m \leq 0.18 \text{ lbs}\]

Surface Quality (Q):

\[ Q \geq 3\]

Load Case (F):

\[ F_1 = 50 \text{ lbs} / F_2 = 75 \text{ lbs} / F_3 = 75 \text{ lbs}\]

The part has to conform to the interface requirements and geometrical boundary conditions shown on page 2 of this document. This requirement cannot be waived.

3. Priorities

Low manufacturing cost is the first priority for this product. Next, the customer cares about light-weighting (low mass) and thirdly, structural performance should be as high as possible. These priorities are shown in the Ishii-matrix below:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Contrain</th>
<th>Optimize</th>
<th>Accept</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Modifications to these requirements have to be negotiated with Management.
Configuration

No forbidden zone for your team

Dimensions

Design freedom: \(\pm 0.800\)

Design freedom: \(\pm 0.100\)

4 \(\phi 0.406\)

4.000