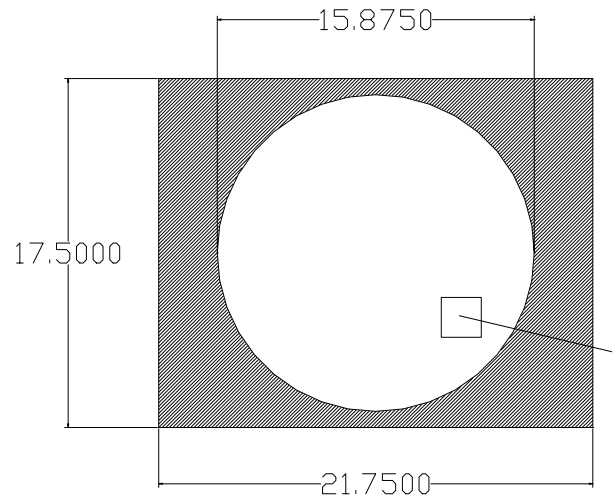


## 500.101.02 Fall 2002 Design of a Spaghetti Stadium “Dome”

### **Objective**

You are designing a scale model for a stadium. The base footprint for your stadium (minimum diameter = 15.875 in. or 403mm) and the maximum pressure that it must sustain (0.5 psi or 3.4 kPa) have been determined. Your design should be the most aesthetically pleasing structure that carries a 0.5 psi demand pressure using the least amount of building materials (spaghetti, and epoxy) while enclosing the greatest possible volume.



### **Geometric Limitations**

Your stadium “dome” must be testable. Therefore, its footprint must rest in the shaded area in the drawing to the right (note dimensions are in inches in the drawing). The actual dome tester is in the laboratory and may be measured at your convenience. Additionally, the height of your dome should be no greater than 9 in. (229 mm). The “clear” volume enclosed by your stadium is based on should be at least 270 in<sup>3</sup> (4400 cm<sup>3</sup>) this is based on a cone with a radius of 8 in. and a height of 4 in. – smaller enclosed volumes are allowed, but will negatively impact the “economic” ranking of the stadium.

### **Dome Design / Build / Test Contest**

<b>Progress:</b> Group meetings with Dr. Schafer	20
<b>Capacity</b> <sup>1</sup> : Surpassing 0.5 psi with dome	30
<b>Efficiency</b> <sup>2</sup> : (Strength / 0.5 psi) · (1 lb / weight)	10
<b>Economic</b> <sup>2</sup> : (Interior Volume / V*) · (1 lb / weight) and strength > 0.5psi	10
<b>Aesthetics</b> <sup>2</sup> : as determined by the average given by your classmates	10
<b>Effort</b> <sup>2</sup> : as determined by the average score given by your classmates	05
<b>Teamwork:</b> Intra-group grading (double-checked by Dr. Schafer - my final say)	<u>15</u>
	<b>100</b>

<sup>1</sup> All teams with domes that surpass 0.5 psi in loading will be exempted from the final. If only one team out of the class fails to pass the load they are exempted from the final; however if more than one team fails to pass the load then all teams that do not make the load must take a final.

<sup>2</sup> Two teams, selected from the winning teams in efficiency, economic, aesthetics, and effort will be selected to be exempted from presentations, and will act as the ‘judges’ in the presentations.

### **Deadlines and Scheduling**

- Mon 28-Oct Introduction to contest
- Tues 29-Oct, Truss Test in Computer Lab
- Wed 30-Oct, Finalization of design contest rules
- Fri 4pm, meet with Dr.S to discuss sketches and preliminary calculations
- Mon 4-Nov, Group work – meetings with Dr. S. (Latrobe 15) must bring 3 sketches!
- Tues 5-Nov, Group work – meetings with Dr. S. (Latrobe 15)
- Wed 6-Nov, Group work – meetings with Dr. S. (Latrobe 15)
- Mon 11-Nov, Cleanup (Latrobe 15)

**Monday, November 11, 8pm - Dinnertime (pizza) grading and testing of domes**

**THE LAB IS IN LATROBE 15 – ENTER THROUGH LATROBE 11**