Light Duty Vehicle CNG Tanks

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Advanced Research Projects Agency-Energy
Can I put my luggage in the trunk?

Uh, sorry no
# Commercial CNG Tanks

<table>
<thead>
<tr>
<th></th>
<th>Type I</th>
<th>Type IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>steel</td>
<td>carbon fiber</td>
</tr>
<tr>
<td>Capacity</td>
<td>12 gallon</td>
<td>12 gallon</td>
</tr>
<tr>
<td>Weight</td>
<td>490 lb</td>
<td>190 lb</td>
</tr>
<tr>
<td>Cost</td>
<td>$1,700</td>
<td>$4,300</td>
</tr>
</tbody>
</table>

- **too heavy**
- **too costly**
- **too bulky**

Current options too heavy, too costly, too bulky

Sources:
1. Advancing Technology for America’s Transportation Future, NPC Study, 2012
2. East Liberty, Ohio Honda Assembly Line
Tank Challenge

**Now**
heavy, expensive, and **cylindrical**

**Need**
lightweight, low cost, and **conformable**

3600 psi load carried by **Tension**

15 psi load carried by **Torque**
ARPA-E Tank Projects

Superplastic-Formed

Modular Cell

10 gge tank
> 90% conformal
> 12 MJ/kg
< $1500 tank

3-D Squeeze Cast

Intestine Tube

conformal
Composite Fabrication Challenge

- Fabricate 3-D structures
- Fabricated cost < $30/kg
- Specific strength > 200 kN·m/kg

Can you make this?