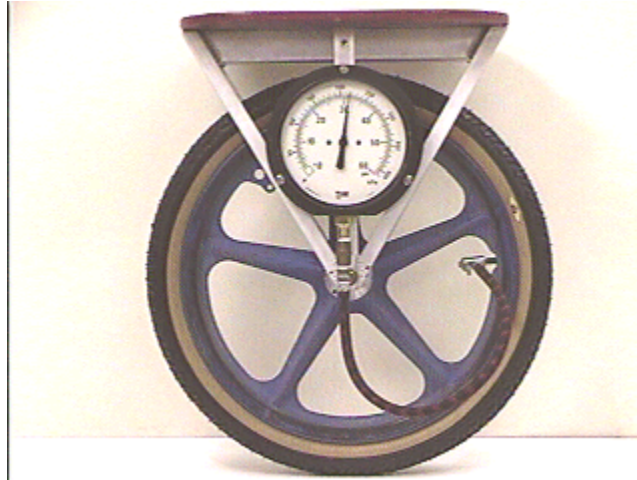


Answer #81

The answer is (d): the pressure in the tire remains the same after the tire is loaded, as seen in an mpeg video by clicking your mouse on the photograph below. Well, it actually increases a *very* small amount, as seen on the video.



When a load is placed on the tire, the bottom of the tire flattens so that the force upward supporting the load is equal to the pressure times the contact area between the road and the tire. It is tempting to conclude that this would lead to a small decrease in the volume of the tire and, according to the ideal gas law, an increase in the tire pressure. However, the flattening of the bottom of the tire is accompanied by a slight bulging of the walls of the tire all around its perimeter, so there is no net decrease in the volume of the tire. The pressure in the tire therefore remains the same. Here the volume of the tire, and thus the pressure, changes by an insignificant amount.

When you put your spare tire in the trunk you put in the air pressure that you intend to drive with when the tire is loaded. When you put the tire on the car the air pressure in the tire does not increase significantly.

If you were to put so much air in the spare tire that the walls could not expand when the tire is installed, then the pressure *would* increase. However, tires are not correctly used at such high pressures.

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