Do solid or hollow objects have a greater potential energy

Overview

In , potential energy is the of an object or system due to the body's position relative to other objects, or the configuration of its particles. The energy is equal to the work done against any restoring forces, such as gravity or those in a spring. The term potential energy was introduced by the 19th-century Scottish engine.

While studying thermal physics at school, I have been taught that solids simply have more potential energy than the liquids and gases. Note that it was said that this potential energy is due to the intermolecular bonds between the atoms.

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While studying thermal physics at school, I have been taught that solids simply have more potential energy than the liquids and gases. Note that it was said that this potential energy is due to the intermolecular bonds between the atoms. However, my intuition makes me doubt this, why would there be.

There is a direct relation between gravitational potential energy and the mass of an object. More massive objects have greater gravitational potential energy. There is also a direct relation between gravitational potential energy and the height of an object. The higher that an object is elevated.

It is the stored energy that an object has due to its position, configuration, or condition. It’s the kind of energy that doesn’t immediately show itself, yet under the right circumstances, can transform dramatically into motion, sound, heat, or other forms of energy. It’s the battery before it.

Most places I look say that solids and liquids have a greater potential energy than gases, however, I don't understand how this is possible considering that there is an increase in potential energy when energy is added to change from one state to another (e.g. from liquid to gas). I'm also not. Does a hollow sphere have more rotational potential energy than a solid sphere?

More of the original gravitational potential energy will be converted into rotational potential energy for the solid sphere than for the hollow sphere. Thus, the hollow sphere must have more translational kinetic energy and will reach the bottom at a greater translational velocity than the solid sphere will.

What is potential energy in physics?

In physics, potential energy is the energy of an object or system due to the body's position relative to other objects, or the configuration of its particles. The energy is equal to the work done against any restoring forces, such as gravity or those in a spring.

Why does a solid sphere have a lower velocity than a hollow sphere?

This is because a solid sphere, with its smaller moment of inertia, will have more rotational potential energy and less translational kinetic energy than a hollow sphere, causing it to reach the bottom at a lower velocity.

Does a solid sphere have a higher translational energy than a hollow sphere?

Based on the equation for the conservation of energy: if a solid sphere has a smaller moment of inertia it will then have a lower rotational energy than a hollow sphere. So, the solid sphere must have a higher translational energy and reach the bottom at a higher velocity. Better?

Yep!.

How do physicists understand potential energy?

To understand potential energy deeply, we must first grasp what physicists mean by “energy.” In simple terms, energy is the capacity to do work or cause change. Work, in physics, means applying a force over a distance. When you lift an object against gravity, stretch a rubber band, or compress a spring, you are doing work on the object.

What is the relation between gravitational potential energy and mass?

There is a direct relation between gravitational potential energy and the mass of an object. More massive objects have greater gravitational potential energy. There is also a direct relation between gravitational potential energy and the height of an object. The higher that an object is elevated, the greater the gravitational potential energy.

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Potential energy for different states

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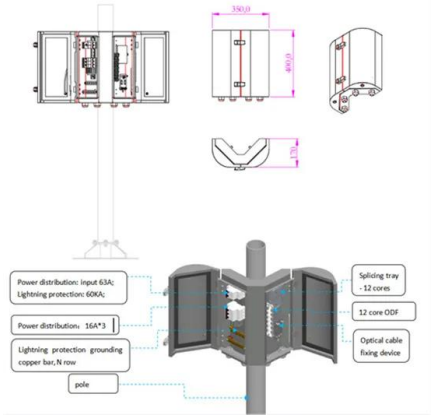
A downhill rolling race

For a rolling object, kinetic energy is split into two types: translational (motion in a straight line) and rotational (spinning). So when you roll a ball down a ramp, it has the most potential energy ...



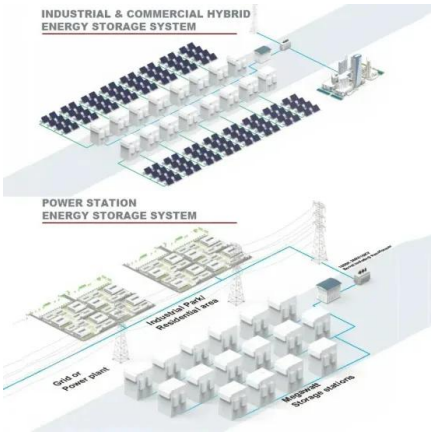
Rotational kinetic energy

This necessarily implies that the angular velocity (and linear velocity) of the hollow cylinder must be less at the bottom of the ramp than that of solid cylinder (otherwise it would have more ...

Potential energy , Definition, Examples, & Facts , Britannica

Potential energy, stored energy that depends

upon the relative position of various parts of a system. For example, a steel ball has more potential energy raised above the ground than it ...



Potential energy

In physics, potential energy is the energy of an object or system due to the body's position relative to other objects, or the configuration of its particles. The energy is equal to the work done ...

Hollow vs. Solid: What's the Difference?

"Solid," on the contrary, implies that an object is completely filled with matter, with no internal spaces or cavities. Solid objects are characterized by their density and compactness, usually making them heavier and more robust ...

Potential Energy

The story of potential energy begins with the ancient Greeks, particularly with Aristotle's concept of "potentiality." Aristotle observed that objects have the potential to change states, such as a ...

Potential energy for different states

As for, our original point, the potential: well, if the body has potential to do work, via lets say, chemical reactions, then its solid form will have a higher activation energy, as the intermolecular bonds have to be broken first - so the energy ...

homework and exercises

But the answer says that since the hollow cylinder has greater moment of inertia, it has greater rotational kinetic energy. How can the hollow cylinder have greater moment of inertia even ...

Physics 101 Fall 02

a) Object w/ smaller I goes faster at bottom, b) both objects have same K at bottom, c) Bigger I means more energy goes into rotation than translation relatively speaking

Concept on potential energy in each state of matter

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What Is Potential Energy? Stored Energy and Its Uses

In gravitational potential energy, for instance, the energy is relative to the ground or some other baseline height. The higher you lift an object, the more potential energy it stores, ...

A dow n h i l l r ol l i n g ra c e

as potential energy due to gravity. The amount of potential energy depends on the object's mass, the strength of gravit and how high it is off the ground. When you drop the object, this potential ...

Potential energy

SummaryOverviewHistoryWork and potential energyPotential energy for near-Earth gravityPotential energy for a linear springPotential energy for gravitational forces between two bodiesPotential energy for electrostatic forces between two bodies

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relative to other objects, or the configuration of its particles. The energy is equal to the work done against any restoring forces, such as gravity or those in a spring. The term potential energy was introduced by the 19th-century Scottish engine...

Potential energy , Definition, Examples, & Facts

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Rolling different masses down a hill

When rolling two marbles of different masses down a hill with the same force, both will reach the bottom at the same speed if only gravity acts on them. However, the heavier marble has more inertia and momentum, which ...

Microsoft Word

Energy is conserved, and since they all start from the same height, their initial potential energies will all be the same. This is converted to rotational and translational kinetic energies in different ...

Potential energy for different states

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newtonian mechanics

As larger objects have greater mass, their potential energy tends to be greater so they tend to break the bonds holding the solid together. If we include air resistance, then it's intuitive that objects with more mass fall ...

Does a hollow sphere and solid sphere (of same outer radius) have

1 I've seen volume of a hollow sphere mostly defined (in books) as volume of its equivalent solid sphere minus the volume of the hollow region/cavity. But often a solid object of ...

[FREE] 5. Calculate the potential energy. 6. Do objects have more

To calculate the potential energy (PE) of an object, we use the formula: h is the height of the object above a reference point (in meters). Determine the height at which the ...

Why does a sphere experience a larger translational kinetic energy ...

Why does a sphere experience a larger translational kinetic energy over its rotational kinetic energy when rolling? Title. I can't seem to grasp a good understanding of concepts about ...

If I have a solid rod and hollow rod with the same ...

The first term is the potential energy; this is the energy is takes to lift the object up the ramp. This is equal to mgh with mm being the mass, g the acceleration due to gravity, and h the height of the ramp. The second term is ...

Potential Energy

Potential energy (referred as U) is the stored energy of position possessed by an object and is that some body possesses due to their position relative to other bodies, ...

Rolling Race

You should find that a solid object will always roll down the ramp faster than a hollow object of the same shape (sphere or cylinder)--regardless of their exact mass or diameter.

Problem 5 A hollow sphere and a hollow cyl [FREE SOLUTION] ...

A hollow sphere and a hollow cylinder of the same radius and mass roll up an incline without slipping and have the same initial center of mass velocity. Which object reaches a greater ...

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