

Why a vacuum is a superior insulator

There are three modes of heat (energy) transfer, convection, conduction and radiation. A vacuum is a good insulator because it eliminates two of the three modes of heat transfer. A vacuum eliminates both convection and conduction.

Convection is when heat is transferred through a medium (gas or liquid) by molecular motion. A vacuum can eliminate this type of heat transfer because convection needs molecules to transfer heat. Since there is an absence of molecules in a vacuum, no heat can be transferred by convection.

Conduction is when heat is transferred through contact. This means, that one body transfers heat to another body through contact. Conduction is typically the most efficient type of heat transfer. Conduction is eliminated in a vacuum because the two walls are separated by the vacuum so they do not touch. In our dispensers and carriers, the only area where the inner and outer shells contact each other is a small area at the top of the dispenser.

Radiation is when heat is transferred by electromagnetic waves. While these waves can travel through a vacuum, it is very inefficient so not much heat is lost.