

# Hand Warmers

Ingredients: Powdered Iron, Water, Activated Charcoal, Salt, Vermiculite, Cellulose, Polypropylene

The iron in the pouch, when exposed to oxygen and water, oxidizes and produces heat ("Air Activated").

When iron oxidizes it produces iron oxide, more commonly referred to as rust. This is an exothermic reaction; it produces heat.

The presence of salt greatly enhances the rusting of metals. This is due to the fact that the dissolved salt increases the conductivity of the aqueous solution formed at the surface of the metal and enhances the rate of electrochemical corrosion. This is one reason why iron tends to corrode much more quickly when exposed to salt (such as that used to melt snow or ice on roads) or moist salty air near the ocean.

Activated charcoal (carbon) is processed to make it porous and to maximize its surface area. The carbon helps disperse the heat.

The vermiculite (a natural clay mineral that expands when heated) is used as an insulator for the purpose of retaining the heat and the cellulose is added as filler.

A polypropylene bag surrounds all of these ingredients. Polypropylene allows air to permeate the ingredients while holding in moisture.