

Fire Research & Investigation Unit

Heads Up



BACKGROUND

Wheat bags (also known as wheat packs or heat sacks) are fabric bags filled with buckwheat or other grains. They are available in a variety of shapes and sizes, including cuddly toys and hot water bottles. They are also manufactured by handicraft enthusiasts and often sold at local markets and fairs. Wheat bags are promoted for their therapeutic value as non-invasive pain relief for muscle strain, arthritis and sports-related injuries. The bags are heated in either a microwave or conventional oven and are intended for external use by placing the bag on parts of the body where pain is occurring.



FIRE RISK

There have been frequent examples of fires where people have overheated their wheat bags, wrapped them in towels, or placed them under bedding to warm beds (which is not what they are designed for). In many cases, this has led to smouldering or flaming fires. According to a 2014 report, heated wheat bags were responsible for 31 fires in New South Wales; these injured 11 people and one person died from smoke inhalation after a wheat bag in a bed caught fire.



Results of an overheated wheat bag which was inadvertently heated in a microwave oven for 20 minutes

Statistics from the Accident Compensation Corporation (ACC) indicate that in a seven-year period, 172 New Zealanders made claims for burns in which wheat bags were involved.

If you follow manufacturers' instructions, these products should heat and cool safely. However, they can also overheat if the microwave turntable fails or is obstructed. Heating the bags repeatedly over a short time period can cause their contents to dry out, making them more likely to overheat. Wheat bags can also create a fire risk if you use them to warm up a bed where they are covered with blankets. This is because the heat is unable to dissipate and smouldering can occur, leading to the bedding catching fire.

HEATING WHEAT BAGS

Microwave ovens have different power settings and there are a wide variety of wheat bags with different sizes and fillings. Follow the manufacturer's guidance for heating. Where no instructions are available, start with one minute on high in your microwave. Then increase by 30-second increments until you have found the ideal setting for you, your particular microwave and that particular wheat bag. Many commercial wheat bag manufacturers suggest no more than four minutes of total heating time.

Should you include water in a microwave when heating a wheat bag?

The Australian/New Zealand Standard for wheat bags¹ states "heating a heat pack with water introduces a further hazard of scalding and has little or no impact on the moisture content or durability of the pack. Further, it delays the pack from heating to a satisfactory level, so that a person might unintentionally overheat it by repeated heating".

How to keep the wheat bag hydrated

Wheat is naturally hygroscopic, which means it absorbs moisture from the air by itself. If you use the wheat bag infrequently, it may absorb enough moisture from the air. Otherwise, industry advice recommends applying moisture directly to the surface of the bag by lightly sprinkling or using a water spray bottle.

TESTING DETAILS

Under test conditions, a commercially available wheat bag was repeatedly heated and cooled to simulate a bag being reheated by a user. The temperatures were recorded up until the point that a smouldering fire occurred. The results are shown on the right.

These results highlight the increased fire risk if the bag is not completely cooled before reheating and also demonstrates that a prolonged heating time may result in a fire.

Wheat Bag Tests by Fire and Emergency

Start	Temperature
19.8°C	
1.0 min	48.0°C
3.0 min	88.7°C
6.0 min	121.4°C
9.0 min	164.2°C
11.0 min	180.1°C*

* Bag smouldering and fire started

LESSONS LEARNED AND RECOMMENDATIONS

Tips for staying safe when using wheat bags:

- Buy bags with clear heating instructions and follow the manufacturer's instructions.
- Only use a wheat bag for direct application to the body.
- Ensure the wheat bag rotates freely on the microwave turntable.
- Use a hot water bottle in confined spaces that can trap heat, such as under blankets or in bedding.
- Don't leave the microwave unattended while heating wheat bags.
- Only store the bag when it has cooled completely (this can take two hours). Leave it to cool in a safe place on a non-combustible surface, e.g. the kitchen sink.

FURTHER INFORMATION

The wheat filling will dry out over time and may start to emit a cooked or burnt smell or you may notice the bag has become discoloured by heat. This is letting you know that it is time to replace your wheat bag. Carefully remove the bag from the heat source and place it on a non-combustible surface, such as a sink or kitchen bench. Let the wheat bag completely cool, then discard it in your household waste.

INFORMATION SOURCES

<https://productsafety.tradingstandards.govt.nz/for-consumers/safety-with-specific-products/wheat-bags>
<http://www.productsafety.gov.au/content/index.phtml/itemId/1000231>

¹ Microwaveable heat packs – Wheat and other organic filling materials AS/NZS 5116:2016