

# United Nuclear

SCIENTIFIC EQUIPMENT & SUPPLIES

## Thermite

Thermite is a chemical mixture composed mainly of a metal oxide and aluminum powder. To produce Iron, Ferric (Iron) Oxide is used, although other metals can be made using other metal oxides.

When ignited, Thermite produces very high temperatures (over 4,000 degrees F), along with generous amounts of molten metal. Thermite is typically very difficult to ignite, requiring a temperature of over 3,000 degrees F just to get the reaction started. It will not ignite using ordinary safety fuse, or from contact with open flame.

Thermite will occasionally ignite using a small length of Magnesium Ribbon as a "fuse". Magnesium Ribbon burns with a brilliant white light... and at a very high temperature... sufficient to ignite Thermite. The Magnesium Ribbon itself can easily be ignited with a small pocket torch or propane torch. Using a disposable lighter or match generally doesn't work very well due to their lower flame temperature.

The best way to start the Thermite reaction is to use Thermite Ignition Mixture. This material is easily ignited with flame or safety fuse and produces a high enough temperature to ignite and start the Thermite reaction reliably.

The trick in using Thermite is to keep the heat contained. If you're trying to weld two metal parts together, cast molten iron into a mold, etc., you must use some sort of ceramic container to contain both the heat, and the molten iron produced. If you simply pour out a pile of Thermite, some Ignition Mix on top and light it, the Thermite will ignite with a shower of sparks & flame. However, all it will do is just spray all the molten metal it produces all over the place and not do any useful work.

Thermite is normally used in a thick ceramic container with about a 1" diameter hole at the bottom, similar to a common flowerpot. First, a small sheet of paper is placed over the hole in the container to prevent the Thermite from leaking out. Then the desired amount of Thermite is poured in. Remember to expect only about ½ as much Iron produced as Thermite (i.e.. if you start with 8 oz. of Thermite, there will be between 4 oz. and 6 oz. of useful Iron produced). A lid is usually placed over the top of the ceramic container to prevent combustion products from spraying out. When the Thermite Ignition Mixture lights, it burns with a very high temperature and transfers that heat to the pile of Thermite. That in turn starts the Thermite reaction. The Thermite will burn, producing incredibly high temperatures and violently spraying molten iron all over the inside of the container. The liquid iron will flow down the sides, and out the hole in the bottom. A plaster mold underneath the ceramic pot will quickly fill with molten iron to cast small metal items, or if you're welding 2 pieces of metal together, the iron will flow into the gap and fuse your two metal pieces.

