

# Re: Burning Magnesium Under Water: Mr. Wizard Strikes Out

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In article <1138635301.972442.86950@xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx>, tlb says...

In response to a question from my son, I recently attempted to demonstrate that magnesium will burn under water – just like it says in the textbooks. I used a thin strip of magnesium (one eighth inch width) which ignited readily in air with a sustained flame. When I placed the Mg strip on the surface of the water, it continued burning vigorously, causing some localized boiling of the water. However, when I plunged the magnesium strip completely under water, the water extinguished the flame ... every single time.

Needless to say, the results of this experiment have somewhat tarnished my reputation as Mr. Wizard. I assume that the reason the flame went out was because of heat transfer effects related to dissociating/vaporizing the water (I tried folding and twisting the magnesium into four-ply strips, but that had no effect).

Could someone tell me what I need to do to make this experiment work? Would using thicker magnesium strips help? If so, what size would I need?

Thank you in advance for your help.

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Water on Magnesium Fires...

"Although water in small quantities accelerates magnesium fires, rapid application of large amounts of water is effective in extinguishing magnesium fires because of the cooling effect of water. Automatic sprinklers will extinguish a typical shop fire where the quantity of magnesium is limited. However, water should not be used on any fire involving a large number of magnesium chips when it is doubtful that there is sufficient water to handle the large area. (A few burning chips can be extinguished by

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dropping them into a bucket of water.) Small streams from portable extinguishers will violently accelerate a magnesium chip fire.

Burning magnesium parts such as castings and fabricated structures can be cooled and extinguished with coarse streams of water applied with standard fire hoses. A straight stream scatters the fire, but coarse drops (produced by a fixed nozzle operating at a distance or by use of an adjustable nozzle) flow over and cool the unburned metal. Some temporary acceleration normally takes place with this procedure, but rapid extinguishment follows if the technique is pursued. Well-advanced fires in several hundred pounds (100 lb equals 45 kg) of magnesium scrap have been extinguished in less than 1 minute with two 37.5 mm (1-1/2 in.) fire hoses. Water fog, on the other hand, tends to accelerate rather than cool such a fire. Application of water to magnesium fires must be avoided where quantities of molten metal are likely to be present; the steam formation and possible metal-water reactions may be explosive."

<http://www.eh.doe.gov/techstds/standard/hdbk1081/hbk1081e.html>

JD

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