

## Re: Dumb Question

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- *From:* Uncle Al <UncleAl0@xxxxxxxxxxxxxx>
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EskWIRED@xxxxxxxxxxxxxx wrote:

I'm sorry in advance for even asking...

I know that a high pressure environment will raise the boiling point of a liquid. I have some vague knowledge of vapor pressure, etc.

The boiling point is that temp at which the liquid's vapor pressure equals the ambient pressure. Boiling point thus varies with depth of liquid, leading to interesting BLEVEs when oil storage fires are fought with water.

But does high pressure also raise the freezing point of a liquid? If not, do any environmental factors raise the freezing point?

Look at a PVT phase diagram. In general, a liquid that contracts upon freezing will have its mp raised by pressure (iron in the Earth's inner core). A liquid that expands upon freezing (water, silicon, gallium, bismuth) will have its mp lowered by pressure – at least until a structural phase transition.

I ask because I saw some blurb about freezing water quickly during some Big Science experiment. The reporter wrote that despite the speed of freezing, the water was actually quite hot. Indeed, he claimed that the frozen water was in excess of 212F.

What is the scoop on this?

Water melts at  $-22\text{ C}/29,990\text{ psi}$ . At higher pressures its melting point rises. A commercial geodynamic (diamond) press can freeze water above its normal boiling point of 373 K (20,000 atmospheres). mp = 800K at 590,000 atmospheres.

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<http://www.lsbu.ac.uk/water/images/phase.gif>

One then envisions the solution to Pentagon recruitment and training woes. Recruit and train the meat, then squeeze it on ice at room temp until needed. Warehouse and stockpile. Pop the pull tabs and there is your army fresh and ready to go.

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Uncle Al

<http://www.mazepath.com/uncleal/>

(Toxic URL! Unsafe for children and most mammals)

<http://www.mazepath.com/uncleal/lajos.htm#a2>

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