**Air vs Water Cooling, Heat Sink, & Thermal Compound Paste Explained**

Hello everyone. In this video we're going to talk about CPU cooling, and we're going to talk about the components that are involved in CPU cooling. And we're also going to discuss the two different types of cooling that can be used to cool a CPU, such as air cooling and water cooling.

Now the biggest heat generator in a computer is the CPU. The CPU is the brain of the computer, and it produces an enormous amount of heat in a very short amount of time. In fact, if a CPU were to run by itself without using any cooling components, the CPU would likely fry itself within 10 seconds. So, to remedy this problem, a CPU needs a heatsink to help dissipate the heat.

A heatsink is basically an aluminum block with fins, that directly makes contact with the CPU.

And the heat sinks purpose is to increase the surface area of the CPU, so that it can make more air contact for cooling. The larger the heatsink the larger the surface area will be, therefore increasing the cooling ability. The fins on the heatsink are designed to further increase the surface area for air circulation. Once the heatsink makes contact with the CPU, the heat will transfer from the CPU to the heatsink where the air will cool the heatsink which will cool the CPU. Then on top of the heatsink would be a fan. The CPU fan is designed to move air across the heatsink to help keep it cool. Now this type of CPU cooling is called air cooling, and this is what the majority of computers use when cooling a CPU,

Now it's important that the heatsink and the CPU make the most contact with each other, so that adequate cooling can take place. So that's why it's important to apply thermal compound on the CPU before attaching the heat sink. Thermal compound is used to fill in the microscopic air gaps between the heatsink and the CPU, to make up for the imperfections of the flat surfaces. Now the surface area is between the CPU and the heatsink are flat. But they are not perfectly flat when examined with a microscope. Thermal compound is designed to fill in the

microscopic air gaps, so that the most contact can be made between the heatsink and the CPU. Because the more contact that the CPU makes with the heatsink, the better the heat transfer will be, which will keep the CPU cooler.

And another type of CPU cooling is water cooling. So, instead of using air, this type of cooling uses water to cool the CPU. So, for example, here is a water cooling unit for the CPU. There is a pump, hosing, and a radiator. and inside this unit is water. This unit is placed directly on top of the CPU, just like a traditional heatsink. And the pump inside constantly circulates the water throughout the entire unit, to help keep the CPU cool. Once the water reaches the radiator, the water is air cooled by a radiator mounted fan. That draws air into the radiator and cools the water. Then the cycle is repeated, so a constant flow of cool water makes contact with the CPU. So, as a result, water cooling cools the CPU better than air cooling， they are also more quiet. But, at the same time, water coolers are more expensive. Now CPU water coolers are not as common as air coolers. So, if you were to buy a new computer today it will most likely have an air cooler. Instead water coolers are more commonly used in high-performance computers, such as gaming computers. Or if you're going to overclock your CPU, then you should use a water cooler.

Now I personally use a third-party CPU air cooler in my computer that I've built. Because I don't need a water cooler. I don't do any overclocking or anything like that. In fact, when I build a new PC I always buy a third party CPU cooler. Because the ones that come with the CPU do not do an adequate job. In fact, the last several computers that I've built, I've always purchased the same CPU cooler. Because I think for the price, it is the best one out there. So, if you want to know the CPU cooler that I use and that I personally recommend. I'll put a link in the description below in this video. And thank you for watching