

Re: CFD – software

Source: <http://unix.derkeiler.com/Newsgroups/comp.os.vms/2006-08/msg01376.html>

- *From:* "David J. Dachtera" <djesys.no@xxxxxxxxxxxxxxxxxxx>
 - *Date:* Mon, 14 Aug 2006 20:56:32 -0500
-

"Steven M. Schweda" wrote:

From: "David J. Dachtera" <djesys.no@xxxxxxxxxxxxxxxxxxx>

Oh, boy. I really should know better...

No argument there.

Question: Why can you not "suck" mercury all the way up a 35 inch column at sea level under standard conditions? (Vacuum pump at one end, other end open.)

Mostly because, unlike air pressure, "suck" is not a real physical concept.

Admittedly, it WAS intended as (partially) a trick question.

Removing air at the top of such a column reduces the air pressure there. (Remove all the air, and there's no air pressure there.) What moves the liquid up the column is the outside air pressure pushing on the liquid at the bottom of the column.

Remember that gravity plays into this scenario, also.

Before you start pumping air out, the air pressure on the liquid at the bottom of the tube on the inside is the same as the air pressure on the liquid outside the tube, so the liquid just sits there. Reduce the air pressure inside the tube, and the air pressure outside the tube will force the liquid to rise until the combination of the air pressure inside the tube and the liquid pressure inside the tube (at the bottom of the

Re: CFD – software

column) matches the air pressure outside the tube.

Even when all the air has been removed from the tube, the air pressure outside the tube can only raise the column of liquid until the pressure at the bottom equals atmospheric pressure, because atmospheric pressure is all there is to do the pushing. "Suck" is not pulling the liquid up, air pressure is pushing it up, and air pressure is finite. This gives you about 30 inches of mercury

(29.92 inches at sea level under "standard" conditions)

or about 34 feet of water.

[snip]

It is frequently the case that an "air conditioning system" is a "closed" system. Typically, this is mostly true in homes (though some do provide for air replacement using the outside air), especially in the case of a window ("room") air conditioner which may provide for a little bit of venting to the outside.

In datacenters, however, it is more common to find that chillers take ambient air in and discharge it (cooled) into the plenum floor, or the reverse: take air in from an overhead plenum and simply discharge it (cooled) back into the room. In this case, the supply of cooled air is usually approximately the same as the supply of warmed air. Local codes may require some air replacement if the conditioned space is considered "occupied".

The fact remains that the primary consideration is the rate at which the equipment adds heat to the environment, and how fast the refrigerator can remove the heat.

Both pieces represent my original statement. Given: "air" is one of the media of heat transfer in this scenario.

Especially for a closed system.
Blowing the air faster doesn't change this.

Be careful not to confuse volume with velocity.

Then again, pushing air through a coil more slowly will increase the air temperature change across the coil, though less total heat may be moved

Re: CFD – software

Re: CFD – software

in the process. Increasing velocity up to the maximum possible given the coil's resistance to air flow will eventually reach a point where the maximum possible heat transfer is being realized, considering the coil/fin material's ability to conduct heat, etc.

I think we've both reached an understanding that we both comprehend cooling / heat transfer as applied to HVAC.

Let's move on...

—

David J Dachtera

dba DJE Systems

<http://www.djesys.com/>

Unofficial OpenVMS Marketing Home Page

<http://www.djesys.com/vms/market/>

Unofficial Affordable OpenVMS Home Page:

<http://www.djesys.com/vms/soho/>

Unofficial OpenVMS–IA32 Home Page:

<http://www.djesys.com/vms/ia32/>

Unofficial OpenVMS Hobbyist Support Page:

<http://www.djesys.com/vms/support/>

.