

NetNotes

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Selected postings from the Microscopy Listserv from September 1, 2017 to October 31, 2017. Complete listings and subscription information can be obtained at <http://www.microscopy.com>. Postings may have been edited to conserve space or for clarity.

EM:

wearing a pacemaker while using field Emission SEMs or FIBs

I was wondering what experience you have had, of a user with an MRI compatible pacemaker and leads, using and maintaining an electron microscope with ion pumps for the column vacuums? We have a Hitachi S-4700 and a Hitachi FB-2000A from 2003. Is it a big no? Can it be done with a distance from the system maintained, is there any shielding that can be worn or any other concerns that I am forgetting? What issues may be encountered? **Pat Scallion** pscallio@dal.ca **Fri Oct 13**

I assume that you are worried about the user and not the imaging. The magnetic fields around (i.e., outside) the instrument would come primarily from the ion pumps and even those are pretty well contained. Also any stray fields are static, i.e., not time varying. The field levels the user would encounter in an MRI far exceed what you will find around an SEM plus they are repetitive so they would have a much stronger effect on the user's pacemaker. If anything I'd be more worried about the user affecting the imaging rather than the SEM affecting the user. **Henk Colijn** colijn.1@osu.edu **Sun Oct 15**

EM:

novel chilled water circulator systems

I have the opportunity to change away from individual chiller units attached to SEMs and TEMs and to work with our physical facilities to design, build, and run something new. I am looking at a single system that will cover multiple microscopes. I am aware of the need for strict temperature control, no vibration, cooling, and pumping redundancy, etc. I wonder if anyone else has gone down this path. **Chris Gilpin** gilpin@purdue.edu **Mon Oct 23**

When I visited the JEOL factory, I learned that they had a large water tank on the roof to feed all of the microscopes by gravity. The only pumping was to pump the "used" water back up to the tank. Because of the large size of the tank, the water temperature had good stability. There was no turbulence in the water flow, and the overall cost of the system was quite low. **John Mardinly** john.mardinly@asu.edu **Mon Oct 23**

We have a building chiller that supplies chilled water for the building temperature control and for heat exchangers used on the microscopes to give us the temperature stability we need. Unless it is oversized, you will not get the temperature stability you require from a building chiller (ours has a 5°F range). Ours is outside so needs to be a 30% glycol/water mixture to survive the Midwest winters. This has worked reasonably well for us since 1998, however, if, or rather when, the building chiller goes down all of the microscopes go down as well. **Alan Nicholls** nicholls@uic.edu **Mon Oct 23**

This is exactly the type of system I am trying to set up in our building. Do you have any more information you can share on the heat exchanger and how the regulation of temperature is achieved? **Ben Micklem** ben.micklem@pharm.ox.ac.uk **Mon Oct 23**

The units were supplied by Haskris (Model WW2 – water-to-water, non-refrigerated heat exchanger). They all have electronic, close temperature control, which has an immersion heater that is used

with a modulating water control valve. The modulating valve varies the flow of secondary cooling water to maintain a relatively constant supply water temperature. The electronically controlled immersion heater switches on and off to compensate for any remaining fluctuations in the supply water temperature, which results in extremely close temperature control. **Alan Nicholls** nicholls@uic.edu **Mon Oct 23**

We have such a "shared" cooling system in our CAMCOR facility that supports around 10 beam instruments. <http://camcor.uoregon.edu/>. We still have each instrument on its own dedicated water-cooled chiller, but each chiller is cooled by the shared cooling system. That way we don't have huge air cooling requirements. There is a short discussion of cooling systems here: <http://probesoftware.com/smf/index.php?topic=951.0> **John Donovan** donovan@uoregon.edu **Mon Oct 23**

Don't do this. We tried it at ANL, had a special commercial, high-capacity unit designed and built to run all the instruments. Individual units on each instrument, all of them cooled by a central cooling system, is better. When your single cooling water system goes down (and it will), then all instruments are dead in the water. However, if the central chiller that services the small units goes down, it can still be replaced by an emergency house water line. Since the house water line is simply taking away the heat from the regulated individual units (all of which have their own controllers), you can keep all the instruments running. This also holds true for routine servicing. If you need to change a filter on your water system, all instruments must be shut down! It was, in my opinion, our only mistake in SAMMLab, and we now essentially use that large single system to cool individual units, which is huge overkill. Two other points: Contamination of the cooling water from all instruments (new and old) gets mixed in the large single system. If one instrument has a problem and contaminates the water, then all instruments get contaminated. Not all instruments run best at the "same temperature." We have had to tune the water temperature of some units to minimize drift, and that temperature is a few degrees different than the other microscopes. This won't likely be an issue with SEMs, but it can be for HREM/AEMs. **Nestor Zaluzec** nestor.zaluzec@gmail.com **Tue Oct 24**

I second this. ASU had a building-wide recirculation system to separate the chillers from the campus chilled water. When it went down, and it did multiple times, every microscope in the building went down. All FEGs—it was a real pain. **John Mardinly** john.mardinly@asu.edu **Tue Oct 24**

Ditto that and very much so—unless setup includes instant switching to city water in emergency by simply turning a few valves (assuming cooling by city water is suitable...policy, water quality/temperature, etc.). **Vitaly Feingold** vitalylazar@att.net **Tue Oct 24**

I absolutely agree with Nestor. We have a JEOL 1010 TEM and a JEOL 1400 TEM, both on the same larger chiller. To me it is a pain. When the chiller goes out, both TEMs have to be turned off. We just had a power failure in the one TEM room, but since the one chiller is connected to that room, then the chiller went out too. Because of that

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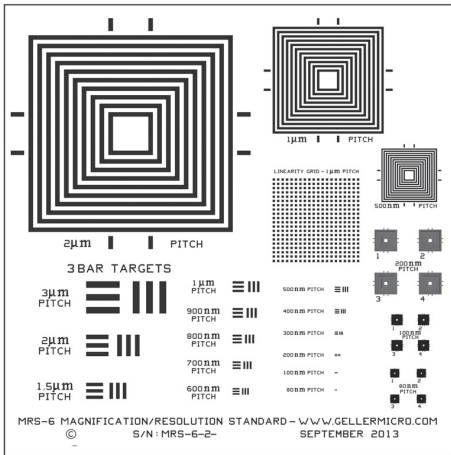
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I had to run to turn off the other TEM in the next separate room. Both instruments were down until I could get power back on. Because of the power failure, the compressor tripped in the chiller, and both TEMs were down another day until JEOL could come out and fix it for us. If I had separate chillers, then I would still be in operation with the one TEM. There are many other stories, but I won't digress. Don't do it. Buy separate chillers for each instrument. You will be happier for it. Lita Drain duraine@bcm.edu Tue Oct 24

I agree with Chris. We have the domestic water tied into the process water system so they can be switched over for maintenance, while, as he said, the individual chillers still run each instrument. Best to have an over temp and flow alarm on the process water system with an alert to your facilities people so they know when it goes down. John Gilpin gilpin@purdue.edu Wed Oct 25

For water filtration, it helps to install the plumbing and canisters for a redundant pair of parallel filters with valves on both sides of each filter unit. That way a single filter can be changed without shutting down the water supply. If you're really stingy, you can even use this to squeeze a little extra life of a filter which no longer provides enough flow on its own. Just use one filter alone at first, and when the flow/pressure begins to drop below acceptable levels, open the valves on the second filter just a little. Steve Kuehn skuehn@concord.edu Wed Oct 25

I totally agree. We have individual chillers for each instrument, and all chillers are connected to the building chilled, processed water. So it is much easier to service individual chillers without shutting down all scopes. Soumitra Ghoshroy rintugr@gmail.com Wed Oct 25

We run a main chiller to cool individual chillers. When main chiller goes down, there is an automatic switch to city water to provide cooling. John Cantino john.catino@mineralstech.com Wed Oct 25

I completely agree with Nestor. Our current system is single units cooled by a building system. There is a backup for the building system I believe. John Mansfield jfmjfm@umich.edu Wed Oct 25

TEM: service for manufacturer unsupported instruments

Is there anybody in this community who has a Zeiss Libera TEM? How do you get service for repairs and maintenance form Zeiss given that Zeiss stopped manufacturing TEMs? Shahrzad Hosseini shahrzad.hosseini@gmail.com Sat Sep 23

As a general rule, once the OEM drops support of your instrument for one reason or another, you go to a third-party support organization. Try reaching out to service engineers who were servicing your instrument while it was supported—even if they are not allowed to help you, they could know who can. Network with used equipment dealers, and speak to other TEM users in your region to find out support options in your geographic location. Google for similar instruments around the world, and contact tool owners to find out where they obtain support. You could also try posting similar request in relevant LinkedIn user groups. Keep in mind that decent third-party service is not cheaper than OEM support. Depending on your geographical location and also age, condition, and degree of neglect of your instrument, the cost of a T&M service call for bringing it back to service could be out of reach. Valery Ray vray@partbeamsystech.com Sat Sep 23

In Spain, Zeiss is still giving us support. Indeed, they have to do it at least until 2024 because we bought the last unit a few years ago. Sometimes you can get support from the community, so if you have some problem, you can post it here. Juan Luis jlribas@us.es Tue Sep 26

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