

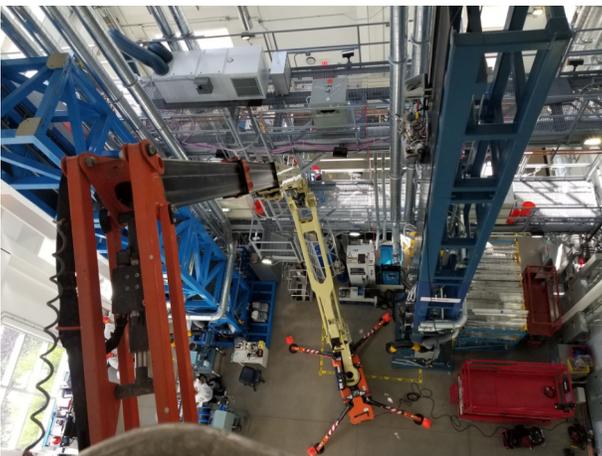
## MSC Design/Build: Bring Us Your Most Challenging Projects



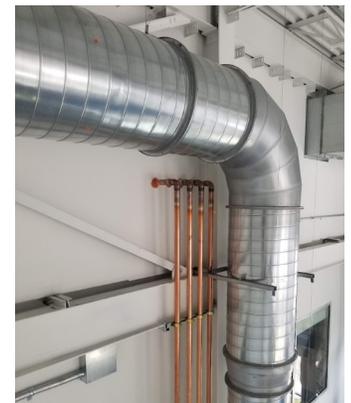
Among the various HVAC, process cooling, and building automation services provided by MSC, design/build is one that many clients might be unaware of. While there are plenty of reputable contractors out there offering standard HVAC design/build services, MSC concentrates primarily on complex micro-projects and special or mission-critical environments. These types of projects are typically too small or complex for most D/B contractors and require advanced-level engineering.



Since MSC was founded in 1978 as a mechanical contractor specializing in ultra-low-temperature vapor recovery systems for the petroleum industry, we've gained decades of invaluable expertise in HVAC, process cooling, and building automation systems. We've engineered, installed, and commissioned numerous turnkey design/build projects for clients that include high-tech manufacturers, compounding pharmacies, cleanrooms, state-of-the-art R&D labs, and many others. We've consistently delivered stable, repeatable environments that meet stringent requirements like pinpoint humidity control, narrow tolerances, ultra-low and cryogenic temperatures, pressure cascades, critical redundancy, PLC controls, and simulated outdoor weather extremes.



MSC has an on-staff team of mechanical engineers including a P.E., and we are licensed in electrical, plumbing, and HVAC. If you are considering a design/build project that may require advanced-level engineering, please contact us at 973-884-5000 for more information.



# Ionocaloric Cooling: Could This New Breakthrough Replace Harmful Refrigerants?

Scientists at the Dept. of Energy's Lawrence Berkeley National Laboratory have developed a promising new refrigeration process that uses ions to drive solid-to-liquid phase changes. This safe, energy-efficient technique, called ionocaloric cooling, could potentially replace high-GWP refrigerants, according to a [paper](#) published recently in the journal *Science*.

Ionocaloric cooling is process that takes advantage of how energy, or heat, is stored or released when a material changes phase, such as when solid ice turns to liquid water. Melting a material absorbs heat from surroundings while solidifying it releases heat. The ionocaloric cycle uses electrically-charged atoms or molecules (ions) to drive this phase change.



The Berkeley Lab team's first experiment using salt made with iodine and sodium alongside ethylene carbonate to move the ions showed a temperature change of 25°C using less than 1V of electricity.

"There are three things we're trying to balance: the GWP of the refrigerant, energy efficiency, and the cost of the equipment itself," said researcher Ravi Prasher. "From the first try, our data looks very promising on all three of these aspects."

The research also suggests that ionocaloric cooling has the potential to be not only GWP-zero, but GWP-negative. According to Prasher's colleague and study co-author Drew Lilley, "using a material like ethylene carbonate could actually be carbon negative, because you produce it by using carbon dioxide as an input." Prasher and Lilley have received a provisional patent for the ionocaloric refrigeration cycle and the technology is now available for licensing by contacting [ipo@lbl.gov](mailto:ipo@lbl.gov).



## MSC OPEN HOUSE

April 15, 2023



## HVAC/R Service Technician Careers

Are you an experienced service technician with a background in light commercial, commercial, or industrial HVAC? New Jersey's premier service specialist in advanced HVAC, process cooling, and building automation is looking for talented individuals like you to join our team! Learn more about working at MSC at [www.mscnj.com/team](http://www.mscnj.com/team)

- Competitive Wages
- Paid Time Off
- Annuity and Pension
- 100% Family Health Coverage
- Dental & Vision Insurance
- Chiropractic Care
- Life Insurance
- Accidental Death
- Temporary Disability



**Experienced Techs:** *Not a union member but interested in joining?*

MSC can set up a conversation with a Business Agent to discuss the steps needed to join the local union

### WHEN

Saturday, April 15, 2023  
10 am – 1 pm

### WHERE

41 South Jefferson Road  
Whippany, New Jersey

### COMPLIMENTARY

Food, refreshments  
& giveaways

# Understanding MERV Filter Ratings and ASHRAE Recommendations

The Minimum Efficiency Reporting Value, commonly known as MERV, is a standard developed by ASHRAE that measures the overall effectiveness of air filters used in HVAC systems. MERV values range from 1-16, with MERV 16 representing the highest value in filters that are not HEPA or ULPA. ASHRAE recommends using filters with a minimum of MERV 13 in all applications. If the existing HVAC system can't accommodate MERV 13, ASHRAE recommends using the highest-MERV filters possible.

The main advantage of using high-MERV filters is, of course, far cleaner, healthier air than lower-MERV systems. In 100% outside air systems, using higher-efficiency pre-filters extend the life of HEPA filters downstream. Many, if not most, existing buildings use filters with a value lower than the recommended MERV 13.

## Can I upgrade to a higher MERV in my existing HVAC system?

It is often possible to upgrade filter efficiency in existing systems, however it's rarely as simple as dropping in a MERV 11 where a MERV 8 used to be. Those considering filter upgrades should have an HVAC specialist like MSC evaluate their system to determine the highest MERV value it can accommodate. Otherwise, too-efficient filters can restrict airflow, degrade system performance, and significantly increase energy use. A professional can also determine whether the system can be altered to accept higher-MERV filters by modifying filter racks, increasing fan speeds, or various other methods.

MERV Range	Average Arrestance	Particle Size (microns)	Typical Applications
1 - 4	60 - 80%	> 10.0	<ul style="list-style-type: none"> <li>• Minimum residential</li> <li>• Minimum light commercial</li> <li>• Equipment protection</li> </ul>
5 - 8	80 - 95%	3.0 to 10.0	<ul style="list-style-type: none"> <li>• Better residential</li> <li>• Industrial workplaces</li> <li>• Typical commercial</li> <li>• Paint booths &amp; finishing</li> </ul>
9 - 12	> 90 - 98%	1.0 to 3.0	<ul style="list-style-type: none"> <li>• Superior residential</li> <li>• Better industrial</li> <li>• Better commercial</li> <li>• Hospital laboratories</li> </ul>
13 - 16	> 95 - 99%	0.30 to 1.0	<ul style="list-style-type: none"> <li>• Superior commercial</li> <li>• Smoke removal</li> <li>• Hospital inpatient</li> <li>• General surgery</li> </ul>
<b>HEPA / ULPA</b>			

## What else should I know about high-MERV filters?

Higher MERV means cleaner air, but it should be understood that these filters load faster and must be changed more frequently. During the spring pollen season, even low-MERV filters can become clogged within a matter of weeks, so high-MERV users must be extra-diligent with filter changes during this period. HVAC systems with high-MERV filters consume more energy than their counterparts, though huge utility bill increases are unlikely when filter upgrades are properly done. These added costs may be well worth the improvement in IAQ, and in pre-filtered systems they may be far outweighed by the savings achieved by having to replace expensive HEPA or ULPA filters less often.

## MSC IN THE NEWS

[FacilitiesNet](#) – 5 Tips to Prepare Your HVAC for Winter

[Facility Executive](#) – 5 Signs Your Commercial HVAC Needs Repairs This Winter

[Mid Atlantic Real Estate Journal](#) – 5 Tips to Keep HVAC Operating at Peak Performance This Winter