



R134A

The product R134A is non-flammable gas that is used as a refrigerant to maintain consistent, cool temperatures as part of a refrigeration system. The University has some temperature sensitive areas, such as data rooms, which require their own refrigeration systems. R134A is contained within a pressurized piping system and is safe to work around. However, like any pressurized chemical, caution should be taken if the system fails and releases refrigerant into a workspace.

If the cooling system were to leak R134A, the primary concern will be to the equipment. Report leaking refrigerant as soon as possible to Data Center Operations to ensure that technicians can be called to repair the system before temperatures rise and equipment is damaged.

It would be extremely unlikely that a cooling system would have a catastrophic failure resulting in the release of all 800 lbs of R134A at once, however, should this occur 2 issues would arise. First, there would be a slight depression of oxygen levels in the room. The normal oxygen level in ambient air is 20.9%. If 800 lbs of R134A were to be released into the room all at once, the oxygen level could drop to 19.2%. This oxygen level is not immediately unsafe for employees.

(Oxygen levels would have to be lower than 19% for an employee to start feeling any negative health effects.) Leave the area and report to Data Center Operations immediately.

The second issue of a catastrophic failure would be the exposure to 1,1,1 2 tetrafluoroethane; the primary ingredient of R134A. Prolonged exposure to high levels of 1,1,1 2 tetrafluoroethane could result in some health issues. (The Occupational Exposure Limit (OEL) for R134A is 1000ppm for an 8 hour time weighted average exposure.) If there is a catastrophic failure of the system, leave the area and report to Data Center Operations Immediately.

% Oxygen	% Nitrogen & Other Gases	R134a (ppm)	Physical effects
20.9%	79%	0	None
20.9%	79%	1,000	
20.8%	79%	5,000	
20.7%	78%	10,000	
20.6%	78%	15,000	
20.5%	78%	20,000	
20.4%	77%	25,000	
20.3%	77%	30,000	
20.2%	76%	35,000	
20.1%	76%	40,000	
20.0%	76%	45,000	
19.9%	75%	50,000	
19.8%	75%	55,000	
19.6%	74%	60,000	
19.5%	74%	65,000	
19.4%	74%	70,000	
19.3%	73%	75,000	
19.2%	73%	80,000	
19.1%	72%	85,000	
19.0%	72%	90,000	
18.9%	72%	95,000	
18.8%	71%	100,000	
18.6%	70%	110,000	
18.4%	70%	120,000	
18.2%	69%	130,000	
18.0%	68%	140,000	
17.8%	67%	150,000	
17.6%	66%	160,000	
17.3%	66%	170,000	
17.1%	65%	180,000	
16.9%	64%	190,000	
16.7%	63%	200,000	
15.7%	59%	250,000	
14.6%	55%	300,000	
13.6%	51%	350,000	
12.5%	47%	400,000	
11.5%	44%	450,000	
10.5%	40%	500,000	
9.4%	36%	550,000	
8.4%	32%	600,000	
7.3%	28%	650,000	
6.3%	24%	700,000	
5.2%	20%	750,000	
4.2%	16%	800,000	
3.1%	12%	850,000	
2.1%	8%	900,000	
1.0%	4%	950,000	
0.0%	0%	1,000,000	

OSHA definition of Oxygen deficient atmosphere <19.5%

Decreased ability to work strenuously. Impaired coordination. Early symptoms

Respiration increases, Lips blue

Mental failure, fainting nausea, unconsciouness, vomiting

8 minutes - fatal, 6 minutes - 50% fatal, 4-5 minutes possible recovery

Coma in 40 seconds, death

WHAT TO DO!

- Only authorized personnel are allowed in data centers. Follow established departmental protocols for entry.
- Check the oxygen monitor on the wall as you enter. Verify that the level is between 19.5% and 23.5% oxygen. If it is not within this range, exit and immediately contact Data Center Operations.
- Leave the room immediately if you see plumes of vapors, spilling liquid, smoke, or any other unusual circumstances.
- Leave the room immediately if you hear a crash or a hiss of gas escaping.
- Report unusual issues immediately to Data Center Operations.

