

DZERO HVAC INFORMATION

Temperature control of D0 collision hall: 69 F +/-1F

Desired relative humidity is 30%-50%. DZero only controls the upper humidity/dewpoint but controlling the lower bound is desirable.

Dew point always less than 50 F.

Fresh air make-up: ¼ volume change per minute

Pond Water is used for first level cooling of the condensers in the freon based chillers (chiller manufacturers York & Trane)

Chilled water (CW) = 40 F +/-2F is cooled by the freon based chillers

Magnet cooling water (LCW) = 65 F supply, +/-10 F (cooled by HX with CW)

Electronic cooling water (DCW) = 56 F +/-1 F supply. (cooled by HX with CW)

Collision hall volume = 100,000 cubic feet.

Main exhaust and supply fans approx. 20,000 cfm

Bottom ventilation exhaust fans 6000 cfm (continuous) and 13,000 cfm (in emergency (cryogenic ODH fans)

ODH monitoring system is employed with 24 sensing heads through out the collision hall volume. ODH is kept class 1 by engineering, not by the monitoring. ODH alarms will trigger turn on of large exhaust fans and change louver positions for maximum fresh air intake.

Fire alarms will shut off the air handlers. There is a halon fire suppression system in our collision hall and computer rooms.

Atmospheric pressure controlled to be slightly positive (0.05" water column) so air flow through leaks to accelerator tunnel are out of our hall and into the tunnel.

Helium levels: continuously monitored desired to be less than 100 ppm.

Pressure of our cooling water is in the range 80-120 psig. Expansion tanks are mounted at the highest elevation on the suction side of the pumps. Water level in the expansion tanks monitored. A water level drop faster than normal indicates a leak in the system.

Russ Rucinski
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We employ freeze protection in our chilled water system. We use approx. 15% propylene glycol. We also have "freeze-stats" at the cooling coils. If cold outside air comes in below 30 F, it will trip off our air handlers to keep the coils from freezing.

Notes:

The dewpoint is kept below 50 F by using cooling coils in the ventilation duct work. The cooling coils have 40 F chilled water circulated through them. The experiment has often asked about adding humidity in the winter time when low outside dewpoints translate to low inside dewpoints. We have no means of humidification designed into system. The dewpoint must be kept below the temperature of any detector surfaces or cooling water used in electronics to prevent water condensation. Electronic heaters are downstream of the cooling coils.

Magnet cooling water (Low conductivity cooling water) cools water cooled copper bus to our superconducting magnet, power supplies, and conventional toroid magnets. Electronic cooling water (DCW) is circulated through finned heat exchangers located in electronics racks. Fans blow air across the heat exchangers and electronics.

We have had leaks in the finned heat exchangers in racks so water leak detector strips are installed in the bottoms of the racks.

The helium levels are monitored. These are important because helium permeates through the glass in photomultiplier tubes. A high level of helium is present in the Tev tunnel. Therefore we seal our hall off from the Tev and try to stay at a higher air pressure.

LCW and DCW mean the same thing. We just call them different names for historical reasons.

Acronyms

CW chilled water

LCW: Low conductivity cooling water

DCW: De-ionized cooling water

HX: Heat exchanger

HVAC: Heating Ventilation and Air Conditioning